مجانا وحصريا

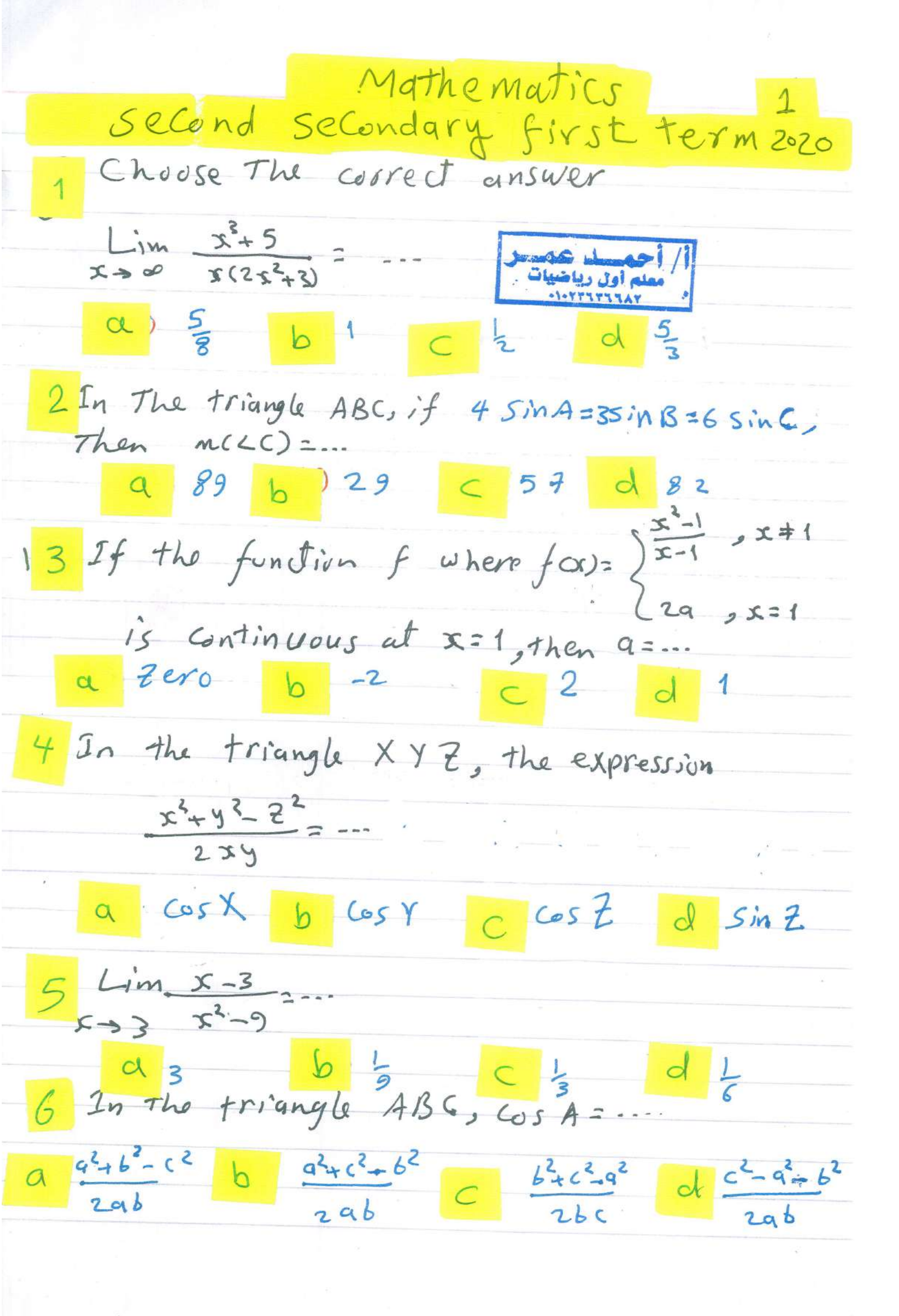
حمل الآن

المراجعة رقم (1)









Mathematics
Second Secondary first term 2020

1 Choose The correct answer

$$\lim_{x \to \infty} \frac{x^2+5}{x(2x^2+3)} = \dots$$

a) $\frac{5}{8}$ b) 1 c) $\frac{1}{2}$ d) $\frac{5}{3}$

2 In The triangle ABC, if $4 \sin A = 3 \sin B = 6 \sin C$, Then $m(\angle C) = \dots$

a) 89 b) 29 c) 57 d) 82

3 If the function f where $f(x) = \begin{cases} \frac{x^2-1}{x-1} & , x \neq 1 \\ 2a & , x = 1 \end{cases}$

is continuous at $x = 1$, then $a = \dots$

a) zero b) -2 c) 2 d) 1

4 In the triangle XYZ, the expression

$$\frac{x^2+y^2-z^2}{2xy} = \dots$$

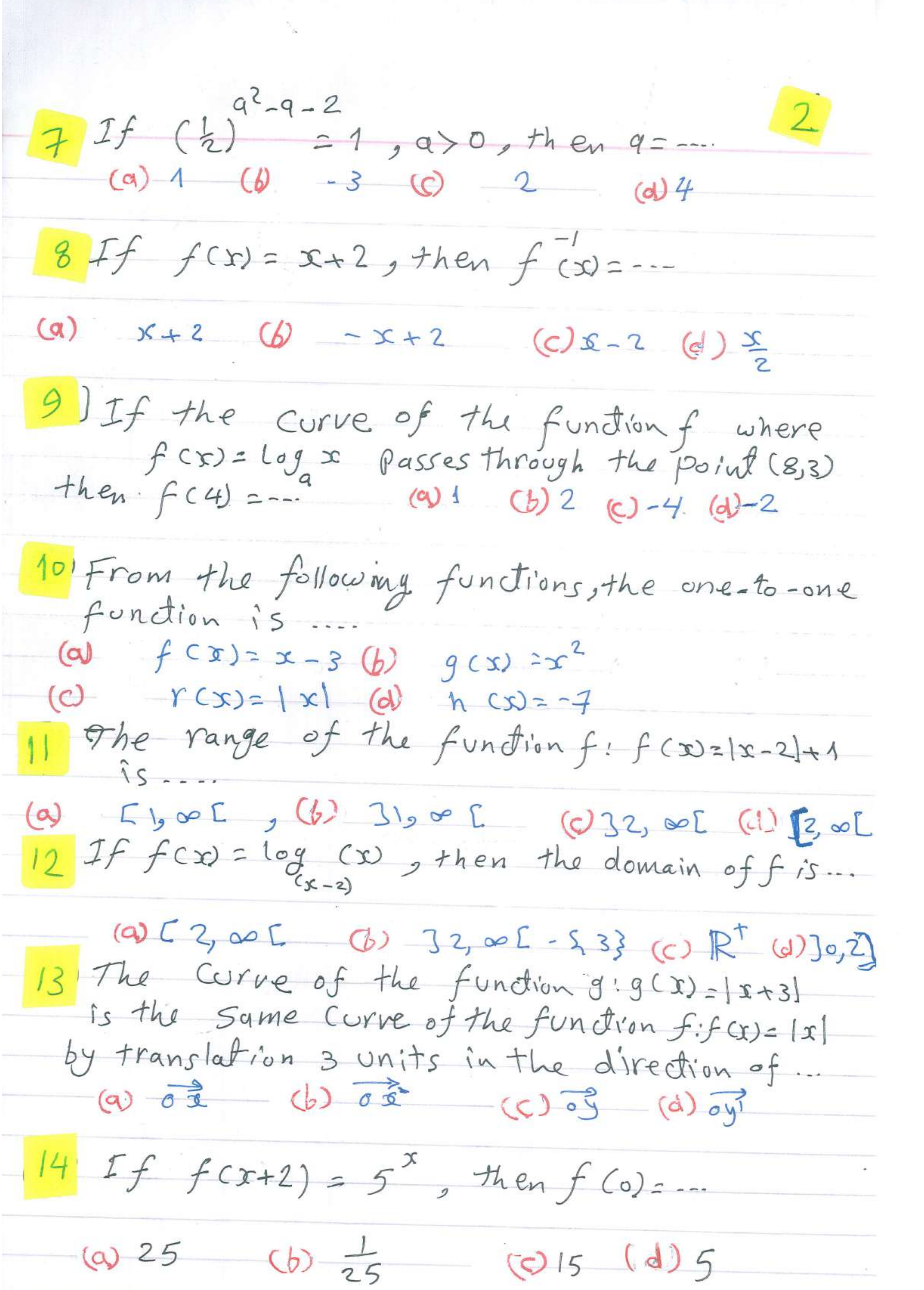
a) $\cos X$ b) $\cos Y$ c) $\cos Z$ d) $\sin Z$

5 $\lim_{x \to 3} \frac{x-3}{x^2-9} = \dots$

a) 3 b) $\frac{1}{9}$ c) $\frac{1}{3}$ d) $\frac{1}{6}$

6 In The triangle ABC, $\cos A = \dots$

a) $\frac{a^2+b^2-c^2}{2ab}$ b) $\frac{a^2+c^2-b^2}{2ab}$ c) $\frac{b^2+c^2-a^2}{2bc}$ d) $\frac{c^2-a^2-b^2}{2ab}$



7 If $(\frac{1}{2})^{a^2-a-2} = 1$, $a > 0$, then $a = ...$

(a) 1 (b) -3 (c) 2 (d) 4

8 If $f(x) = x+2$, then $f^{-1}(x) = ...$

(a) $x+2$ (b) $-x+2$ (c) $x-2$ (d) $\frac{x}{2}$

9) If the curve of the function f where $f(x) = \log_a x$ passes through the point (8,3) then $f(4) = ...$ (a) 1 (b) 2 (c) -4 (d) -2

10) From the following functions, the one-to-one function is ....

(a) $f(x) = x-3$ (b) $g(x) = x^2$

(c) $r(x) = |x|$ (d) $h(x) = -7$

11 The range of the function $f: f(x) = |x-2|+1$ is ....

(a) $[1, \infty[$, (b) $]1, \infty[$ (c) $]2, \infty[$ (d) $[2, \infty[$

12 If $f(x) = \log_{(x-2)}(x)$, then the domain of f is ...

(a) $[2, \infty[$ (b) $]2, \infty[- \{3\}$ (c) $\mathbb{R}^+$ (d) $]0, 2]$

13 The curve of the function $g: g(x) = |x+3|$ is the same curve of the function $f: f(x) = |x|$ by translation 3 units in the direction of ...

(a) $\overrightarrow{ox}$ (b) $\overrightarrow{ox'}$ (c) $\overrightarrow{oy}$ (d) $\overrightarrow{oy'}$

14 If $f(x+2) = 5^x$, then $f(0) = ...$

(a) 25 (b) $\frac{1}{25}$ (c) 15 (d) 5

15

ABC is a triangle in which

$$\frac{\sin A}{3} = \frac{2\sin B}{5} = \frac{\sin C}{4}$$, then $a:b:c = \dots$

(a) 6 : 5 : 8 (b) 8 : 5 : 6 (c) 7 : 2 : 4 (d) 3 : 5 : 6

16 $\lim_{x \to \infty} \frac{\sqrt{x^2+3}}{2x+1} = \dots$

(a) 1 (b) $\frac{3}{2}$ (c) $\frac{1}{2}$ (d) 3

17 $\lim_{x \to 0} \frac{x^2+x}{x} = \dots$

(a) 1 (b) 0 (c) 2 (d) doesn't exist

18 If $f: f(x) = \begin{cases} ax^2 - 6, & x \neq 2 \\ 2a, & x = 2 \end{cases}$

is continuous at $x = 2$, then $a = \dots$

(a) 4 (b) $\frac{3}{2}$ (c) 3 (d) $\sqrt{3}$

19 In ΔABC, if $2\sin A = 3\sin B = 4\sin C$, then $a:b:c = \dots$

(a) 2 : 3 : 4 (b) 9 : 3 : 2 (c) 2 : 4 : 6 (d) 6 : 4 : 3

20 In ΔXYZ, if $x = 3$ cm, $y = 4$ cm, and $z = 6$ cm, then $\cos Z = \dots$

(a) $\frac{-11}{24}$ (b) $\frac{24}{11}$ (c) $\frac{-11}{12}$ (d) $\frac{-12}{11}$

21 The opposite figure represents the graph of the function f, then $\lim_{x \to 1} f(x) = \dots$

y, 3, 2, 1, x, x', -2, -1, -1, -2, 1, 2, 3, y'

(a) 2 (b) 3

(c) 1 (d) not exist

22 $\lim_{x \to 0} \frac{1+x}{4x-1} = \dots$

(a) -1 (b) $\frac{1}{4}$ (c) $-\frac{1}{4}$ (d) 1

23 $\lim_{x \to 1} \frac{x^7 - 1}{x - 1} = \dots$

(a) 7 (b) 8 (c) 6 (d) zero

24 $\lim_{x \to \infty} \frac{x^{-3} + 3x^{-2} + 1}{x^{-2} + x^{-1} + 3} = \dots$

(a) 2 (b) 1 (c) 3 (d) $\frac{1}{3}$

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25 $\lim_{x \to 2} 2x \csc 4x = \dots$

(a) 2 (b) 4 (c) $\frac{1}{2}$ (d) zero

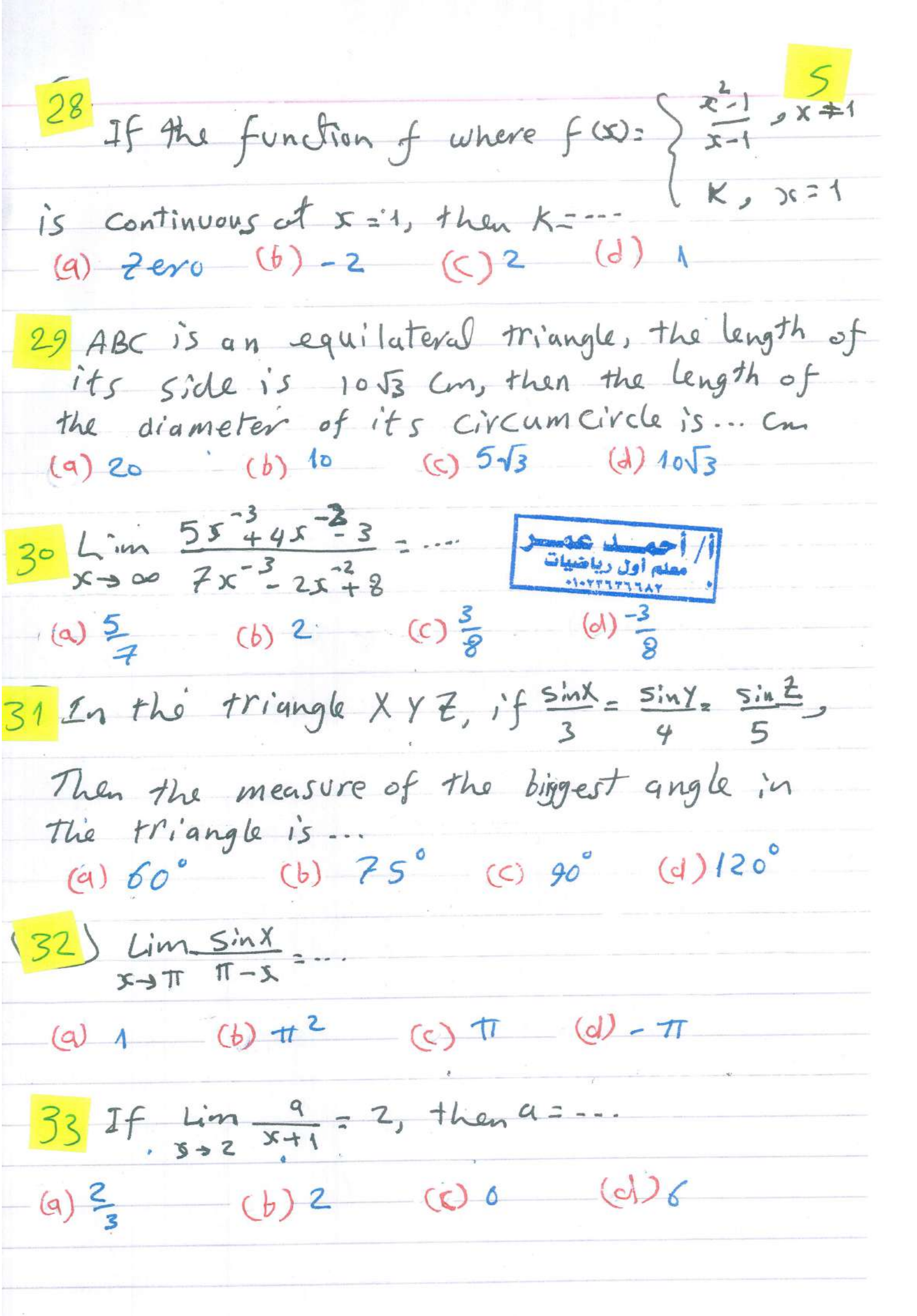
26 If $f(x) = x^2$, then $\lim_{x \to 2} f(f(x)) = \dots$

(a) 2 (b) 4 (c) 16 (d) 32

27 The function $f: f(x) = 4x^{-3} + \frac{x}{x^2 - 9}$ is continuous for every $x \in \dots$

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{0\}$

(c) $\mathbb{R} - \{3, -3\}$ (d) $\mathbb{R} - \{3, -3, 0\}$



5

28 If the function f where $f(x) = \begin{cases} \frac{x^2-1}{x-1}, & x \neq 1 \\ K, & x = 1 \end{cases}$ is continuous at $x = 1$, then $K = \ldots$

(a) zero (b) -2 (c) 2 (d) 1

29 ABC is an equilateral triangle, the length of its side is $10\sqrt{3}$ cm, then the length of the diameter of its circumcircle is … cm

(a) 20 (b) 10 (c) $5\sqrt{3}$ (d) $10\sqrt{3}$

30 $\lim\limits_{x \to \infty} \frac{5x^{-3} + 4x^{-2} - 3}{7x^{-3} - 2x^{-2} + 8} = \ldots$

(a) $\frac{5}{7}$ (b) 2 (c) $\frac{3}{8}$ (d) $\frac{-3}{8}$

31 In the triangle XYZ, if $\frac{\sin X}{3} = \frac{\sin Y}{4} = \frac{\sin Z}{5}$, Then the measure of the biggest angle in the triangle is …

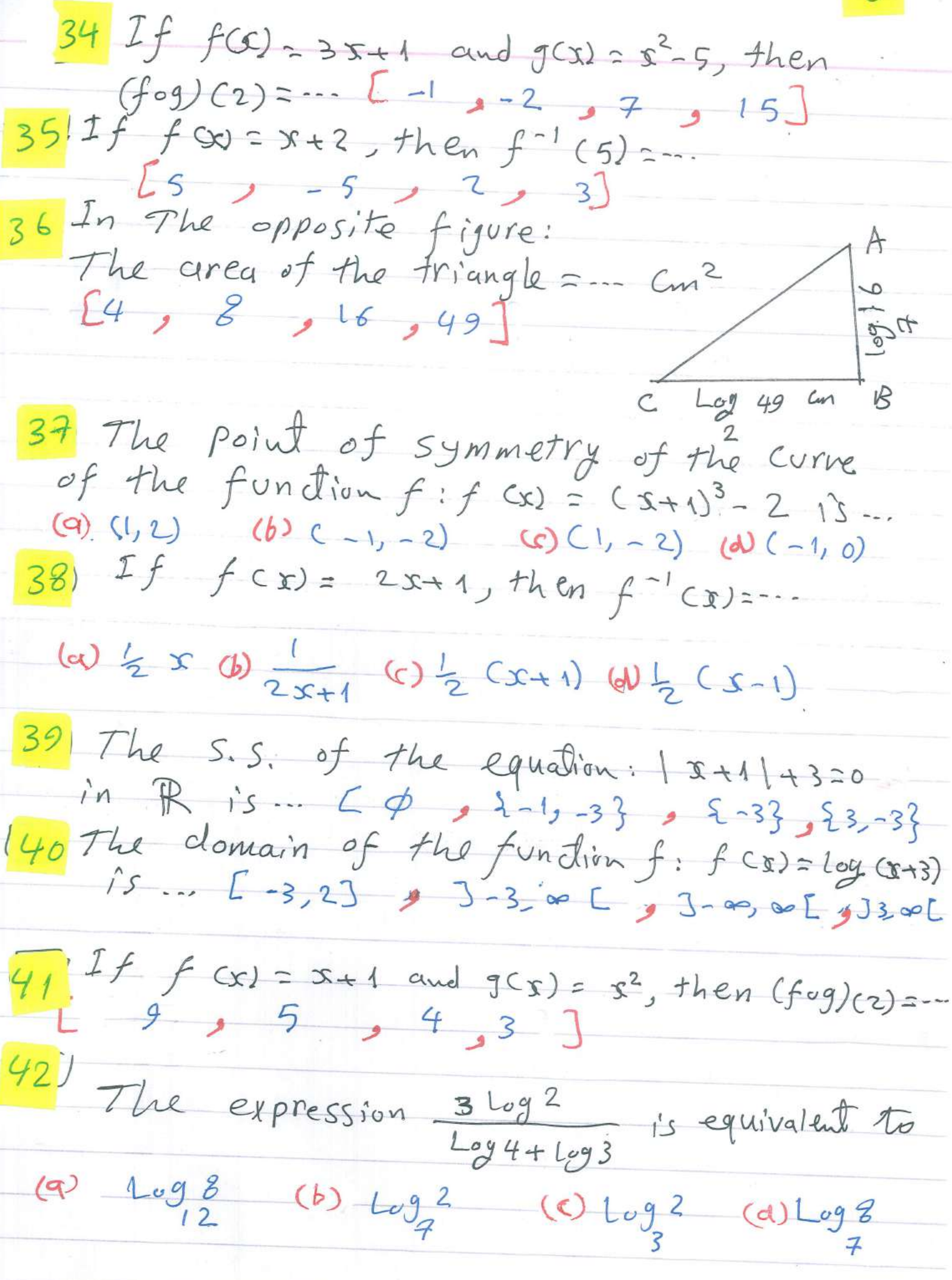
(a) $60°$ (b) $75°$ (c) $90°$ (d) $120°$

32 $\lim\limits_{x \to \pi} \frac{\sin x}{\pi - x} = \ldots$

(a) 1 (b) π^2 (c) π (d) $-\pi$

33 If $\lim\limits_{x \to 2} \frac{a}{x+1} = 2$, then $a = \ldots$

(a) $\frac{2}{3}$ (b) 2 (c) 0 (d) 6



34 If $f(x) = 3x+1$ and $g(x) = x^2-5$, then $(f\circ g)(2) = \dots$ [-1 , -2 , 7 , 15]

35 If $f(x) = x+2$, then $f^{-1}(5) = \dots$ [5 , -5 , 2 , 3]

36 In The opposite figure:
The area of the triangle $= \dots$ cm^2
[4 , 8 , 16 , 49]

37 The point of symmetry of the curve of the function $f: f(x) = (x+1)^3 - 2$ is ...
(a) $(1, 2)$ (b) $(-1, -2)$ (c) $(1, -2)$ (d) $(-1, 0)$

38 If $f(x) = 2x+1$, then $f^{-1}(x) = \dots$

(a) $\frac{1}{2}x$ (b) $\frac{1}{2x+1}$ (c) $\frac{1}{2}(x+1)$ (d) $\frac{1}{2}(x-1)$

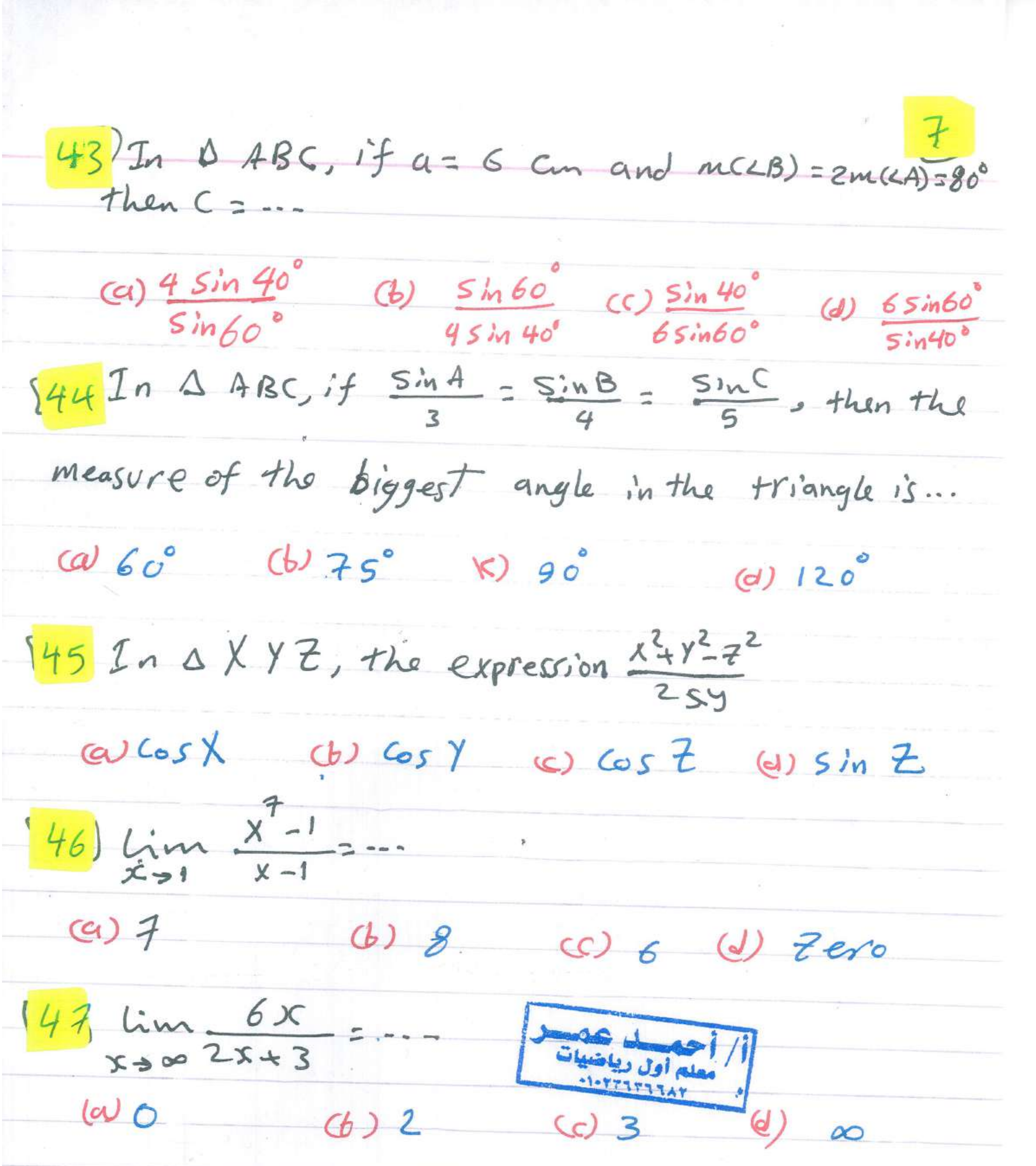
39 The S.S. of the equation: $|x+1|+3=0$ in $\mathbb{R}$ is ... [ϕ , $\{-1, -3\}$, $\{-3\}$, $\{3, -3\}$]

40 The domain of the function $f: f(x) = \log(x+3)$ is ... [$[-3, 2]$, $]-3, \infty[$, $]-\infty, \infty[$, $]3, \infty[$]

41 If $f(x) = x+1$ and $g(x) = x^2$, then $(f\circ g)(2) = \dots$
[9 , 5 , 4 , 3]

42 The expression $\frac{3\log 2}{\log 4 + \log 3}$ is equivalent to

(a) $\log_{12} 8$ (b) $\log_7 2$ (c) $\log_3 2$ (d) $\log_7 8$



43) In ΔABC, if $a = 6$ cm and $m(\angle B) = 2m(\angle A) = 80^\circ$ then $c = \dots$

(a) $\frac{4 \sin 40^\circ}{\sin 60^\circ}$ (b) $\frac{\sin 60^\circ}{4 \sin 40^\circ}$ (c) $\frac{\sin 40^\circ}{6 \sin 60^\circ}$ (d) $\frac{6 \sin 60^\circ}{\sin 40^\circ}$

44) In ΔABC, if $\frac{\sin A}{3} = \frac{\sin B}{4} = \frac{\sin C}{5}$, then the measure of the biggest angle in the triangle is...

(a) 60° (b) 75° (c) 90° (d) 120°

45) In ΔXYZ, the expression $\frac{x^2+y^2-z^2}{2xy}$

(a) $\cos X$ (b) $\cos Y$ (c) $\cos Z$ (d) $\sin Z$

46) $\lim_{x \to 1} \frac{x^7 - 1}{x - 1} = \dots$

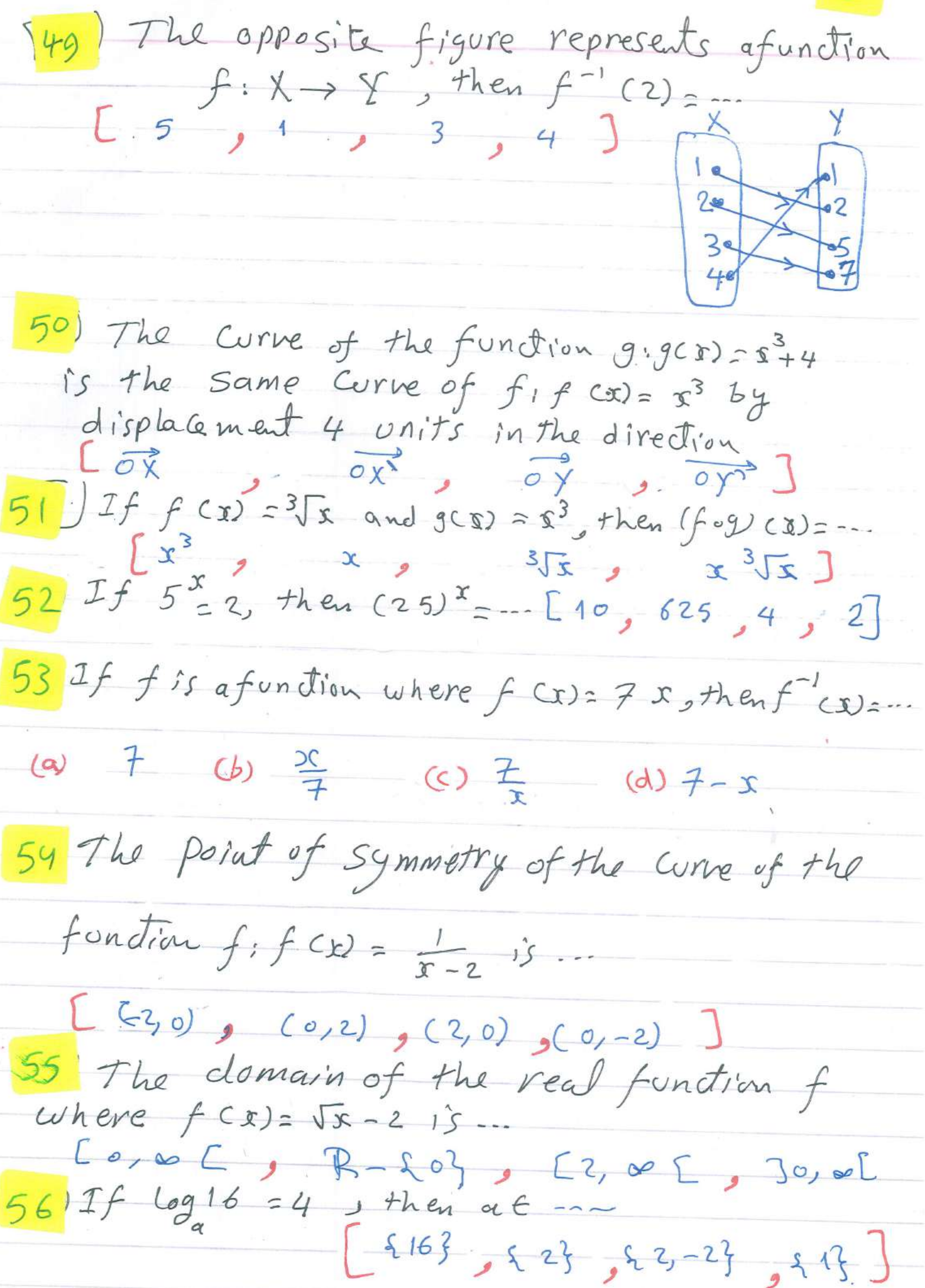
(a) 7 (b) 8 (c) 6 (d) zero

47) $\lim_{x \to \infty} \frac{6x}{2x+3} = \dots$

(a) 0 (b) 2 (c) 3 (d) ∞

48) ABC is a triangle in which $\frac{\sin A}{3} = \frac{2 \sin B}{5} = \frac{\sin C}{4}$, then $a:b:c = \dots$

(a) 6:5:8 (b) 8:5:6 (c) 7:2:4 (d) 3:5:6



49) The opposite figure represents a function $f: X \to Y$, then $f^{-1}(2) = \dots$

[5 , 1 , 3 , 4]

50) The curve of the function $g: g(x) = x^3 + 4$ is the same curve of $f: f(x) = x^3$ by displacement 4 units in the direction

[$\overrightarrow{OX}$, $\overrightarrow{OX'}$, $\overrightarrow{OY}$, $\overrightarrow{OY'}$]

51) If $f(x) = \sqrt[3]{x}$ and $g(x) = x^3$, then $(f \circ g)(x) = \dots$

[x^3 , x , $\sqrt[3]{x}$, $x\sqrt[3]{x}$]

52) If $5^x = 2$, then $(25)^x = \dots$ [10 , 625 , 4 , 2]

53) If f is a function where $f(x) = 7x$, then $f^{-1}(x) = \dots$

(a) 7 (b) $\frac{x}{7}$ (c) $\frac{7}{x}$ (d) $7 - x$

54) The point of symmetry of the curve of the function $f: f(x) = \frac{1}{x-2}$ is ...

[$(-2, 0)$, $(0, 2)$, $(2, 0)$, $(0, -2)$]

55) The domain of the real function f where $f(x) = \sqrt{x} - 2$ is ...

[$[0, \infty[$, $\mathbb{R} - \{0\}$, $[2, \infty[$, $]0, \infty[$]

56) If $\log_a 16 = 4$, then $a \in \dots$

[$\{16\}$, $\{2\}$, $\{2, -2\}$, $\{1\}$]

57) $\lim_{x \to \infty} \frac{x^{-2}+3}{x^{-3}+6} = \dots$

(a) $\frac{1}{2}$ (b) 2 (c) 3 (d) 6

58) If $2 \sin A = 3 \sin B = 4 \sin C$, then $a:b:c = \dots$

(a) 2:3:4 (b) 6:4:3 (c) 1:3:2 (d) 5:7:9

59) If the function f where $f(x) = \begin{cases} \cos 2x + 2, & x \neq 0 \\ a - 1, & x = 0 \end{cases}$ is continuous at $x = 0$, then $a = \dots$

(a) 1 (b) 2 (c) 3 (d) 4

60) In ΔXYZ, $\frac{x^2+y^2-z^2}{2xy} = \dots$

(a) $\cos Z$ (b) $\cos X$ (c) $\sin Z$ (d) $\cos Y$

61) $\lim_{x \to \infty} \frac{12^{\frac{1}{x}}}{x} = \dots$

(a) 0 (b) 1 (c) ∞ (d) 12

62) $\lim_{x \to 0} \frac{x^2 - x + \sin x}{2x} = \dots$

(a) 1 (b) 0 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

63) In ΔABC, $a:b:c = 3:2:2$, then $\cos A = \dots$

(a) $\frac{1}{8}$ (b) $\frac{-1}{8}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$

64) From the following functions, the one-to-one function is ...
(a) $f_1(x) = x^2$ (b) $f_2(x) = 3x-1$ (c) $f_3(x) = |x|$ (d) $f_4(x) = 2$

65 The domain of the function $f: f(x) = \frac{5}{x^2-9}$ is...
(a) $]-3,3[$ (b) $\mathbb{R}-[-3,3]$ (c) $\mathbb{R}-]-3,3[$ (d) $\mathbb{R}-\{-3,3\}$

66 If $5^{x-3} = 4^{x-3}$, then $x = ...$
(a) 2 (b) 8 (c) 3 (d) 4

67 If the curve $y = \log_4(ax)$ passes through $(1,2)$, Then $a = ...$ (a) 8 (b) 16 (c) 3 (d) 4

68 $f: [-3,3[\to \mathbb{R}$ where $f(x) = x^2$ is an ... function
(a) odd (b) even (c) otherwise (d) one-to-one

69 If $f(x) = \sqrt{4-x^2}$, then the domain of $f = ...$
(a) $[-2,2[$ (b) $[-2,2]$ (c) $]-2,2[$ (d) $]-2,2]$

70 If the curve $y = \log_4(1-ax)$ passes through $(\frac{1}{4}, -\frac{1}{2})$ then $\log_a x = ...$ at this point
(a) 2 (b) 3 (c) -2 (d) 4

71 The area included between the curve of the two functions $f: f(x) = |x+3|-2$, $g: g(x) = 0$ equals ... square units
(a) 2 (b) 3 (c) 4 (d) 5

72) The domain of the function $f: f(x) = \sqrt{4-x^2}$ is ... (a) $[-2,2]$ (b) $]-2,2[$ (c) $[-2,3[$ (d) $]-2,3]$

73 If $f(x) = 3x+1$ and $g(x) = x^2-1$, then $(f \circ g)(2) = \ldots$

[10 , 3 , 6 , 21]

74 If $\log_3 x = -1$, then $x = \ldots$

[3 , -3 , $\frac{1}{3}$, $\frac{-1}{3}$]

75) If $x^{\frac{3}{2}} = 8$, then $x = \ldots$ [8 , 6 , 4 , 2]

76 If $3^x = 5$, then $x = \ldots$

(a) 3 (b) $\log_3 5$ (c) $\log_5 3$ (d) $\frac{5}{3}$

77 $\log_{0.09} (0.3)^{-2} = \ldots$ [-1 , -2 , $\frac{1}{2}$, $\frac{1}{3}$]

78 If $\log 3 = x$, $\log 4 = y$, then $\log 12 = \ldots$

[$(x+y)$, xy , $x-y$, $\log x + \log y$]

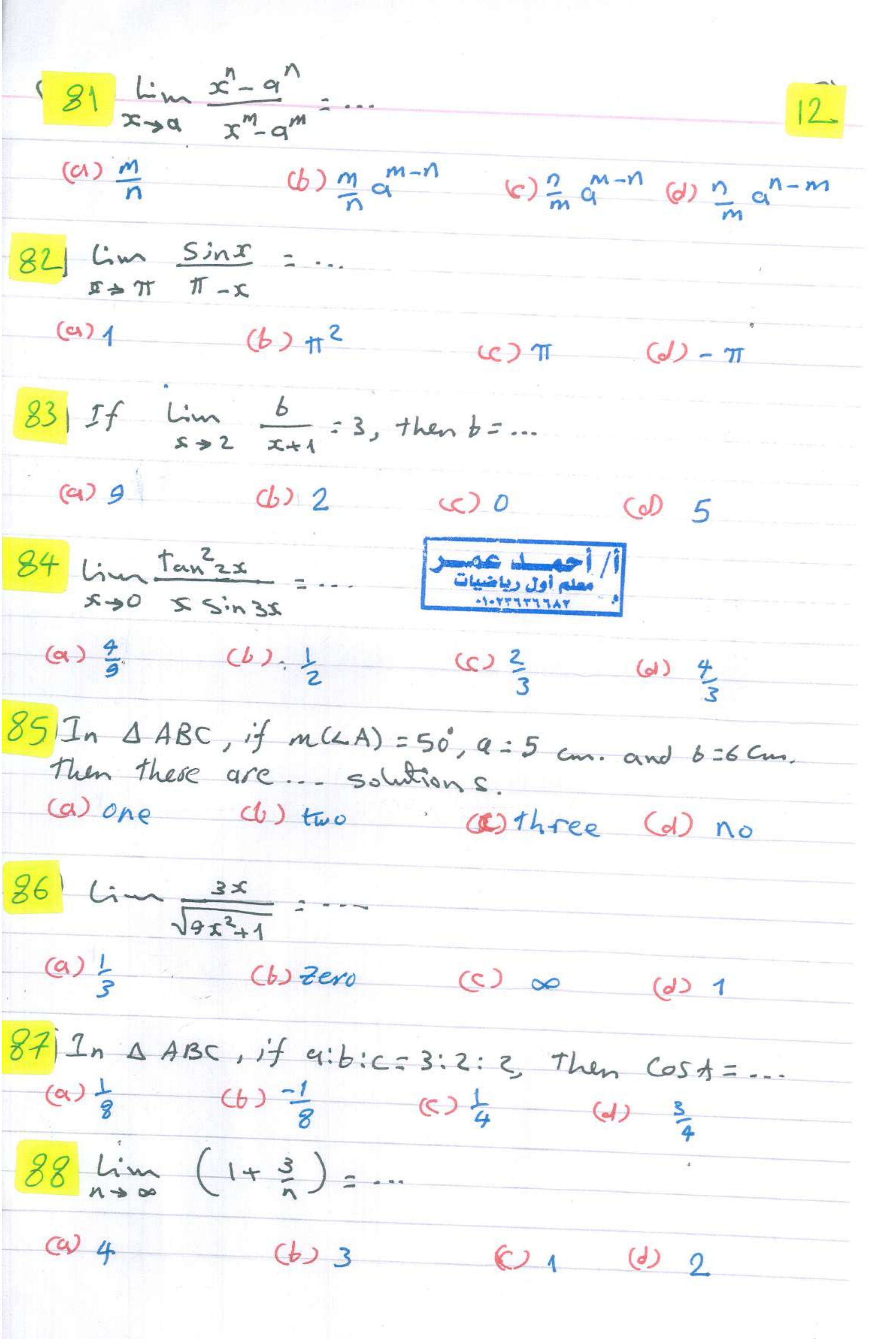
79 If $x = 5+2\sqrt{6}$, then $\log(x + \frac{1}{x}) = \ldots$

[1 , $5-2\sqrt{6}$, 10 , $5+2\sqrt{6}$]

80 If $a \in \mathbb{R}^+ - \{1\}$, x and $y \in \mathbb{R}^+$, $\log_a y \neq 0$, then

$$\frac{\log_a x}{\log_a y} = \ldots\ldots$$

[$\log_a \frac{x}{y}$, $\log_a (x-y)$, $\log_a x - \log_a y$, $\log_y x$]



81 $\lim\limits_{x \to a} \dfrac{x^n - a^n}{x^m - a^m} = \ldots$

(a) $\frac{m}{n}$ (b) $\frac{m}{n} a^{m-n}$ (c) $\frac{n}{m} a^{m-n}$ (d) $\frac{n}{m} a^{n-m}$

82 $\lim\limits_{x \to \pi} \dfrac{\sin x}{\pi - x} = \ldots$

(a) 1 (b) π^2 (c) π (d) $-\pi$

83 If $\lim\limits_{x \to 2} \dfrac{b}{x+1} = 3$, then $b = \ldots$

(a) 9 (b) 2 (c) 0 (d) 5

84 $\lim\limits_{x \to 0} \dfrac{\tan^2 2x}{x \sin 3x} = \ldots$

(a) $\frac{4}{9}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{4}{3}$

85 In ΔABC, if $m(\angle A) = 50^\circ$, $a = 5$ cm. and $b = 6$ cm.
Then there are ... solutions.

(a) one (b) two (c) three (d) no

86 $\lim \dfrac{3x}{\sqrt{9x^2+1}} = \ldots$

(a) $\frac{1}{3}$ (b) zero (c) ∞ (d) 1

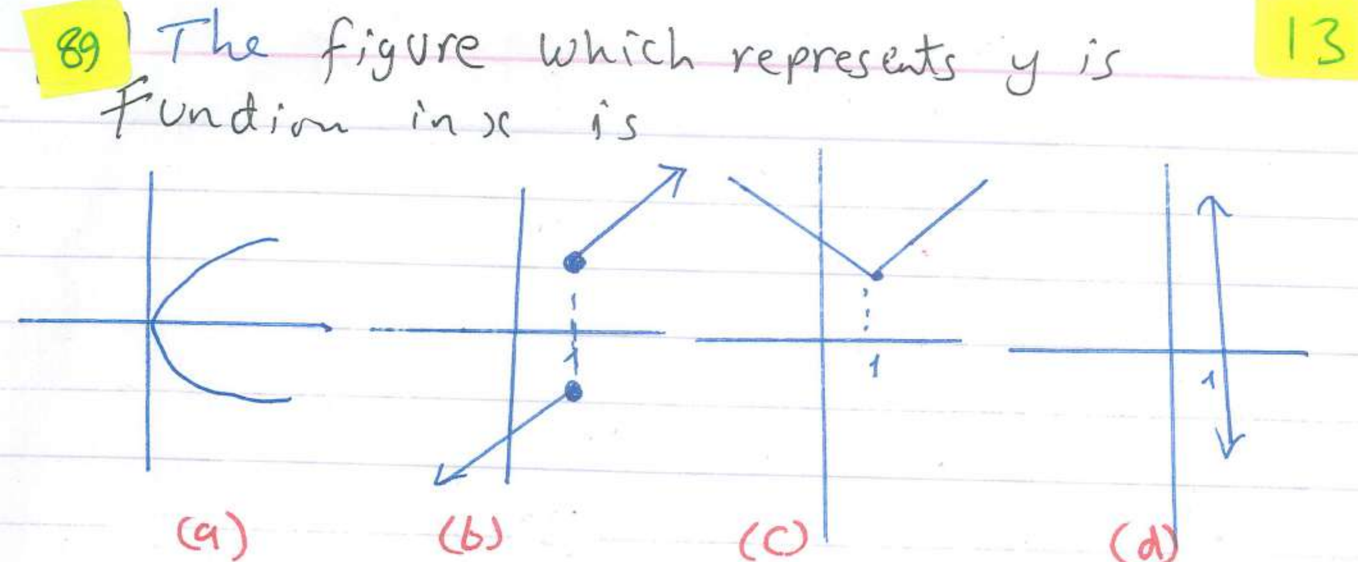
87 In ΔABC, if $a:b:c = 3:2:2$, Then $\cos A = \ldots$

(a) $\frac{1}{8}$ (b) $\frac{-1}{8}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$

88 $\lim\limits_{n \to \infty} \left(1 + \frac{3}{n}\right) = \ldots$

(a) 4 (b) 3 (c) 1 (d) 2

89) The figure which represents y is function in x is 



90) The even function from the functions that are defined by the following rules is ...

(a) $f(x) = x^3$ (b) $f(x) = \sin x$

(c) $f(x) = x \cos x$ (d) $f(x) = x \sin x$

91) If f is an even function, 2 ∈ the domain of f, then $f(2) + f(-2) = \dots$

(a) zero (b) 4 (c) 2 (d) $2f(2)$

92) If f is an odd function, $f(1) = 2$, then which of the following points lies on the curve of f?

(a) $(-1, 2)$ (b) $(-1, -2)$ (c) $(1, -2)$ (d) $(-1, 0)$

93) If $f(x) = 5$, then the domain of the function f is...

(a) $\mathbb{R}$ (b) $\mathbb{R}^+$ (c) $\{5\}$ (d) $\mathbb{R} - \{5\}$

94) The domain of the function $f: f(x) = \frac{1}{x-3} + 1$ is...

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{-3\}$ (d) $\mathbb{R} - \{3\}$

95) The range of the function $f: f(x) = 2 - \frac{3}{x-1}$ is...

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{2\}$ (d) $\mathbb{R} - \{3\}$

96 In ΔXYZ, the expression $\frac{x^2+y^2-z^2}{xy} = \ldots$

(a) $\sin Z$ (b) $\cos Z$ (c) $\frac{1}{2}\cos Z$ (d) $2\cos Z$

97 $\lim_{x \to 3} \frac{x-3}{x^2-9} = \ldots$

(a) 3 (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) 6

98 In ΔLMN, if $5\sin L = 3\sin M = 2\sin N$, then $l : m : n = \ldots$

(a) 6:15:10 (b) 6:10:15 (c) 6:5:15 (d) 10:6:15

99 If $a:b:c = 5:8:7$, then $\cos C = \ldots$

(a) $\frac{1}{2}$ (b) 0 (c) -1 (d) 1

100 If $f(x) = \begin{cases} 2x+k, & x > 1 \\ 5-x, & x < 1 \end{cases}$ has a limit at $x = 1$

then $k = \ldots$

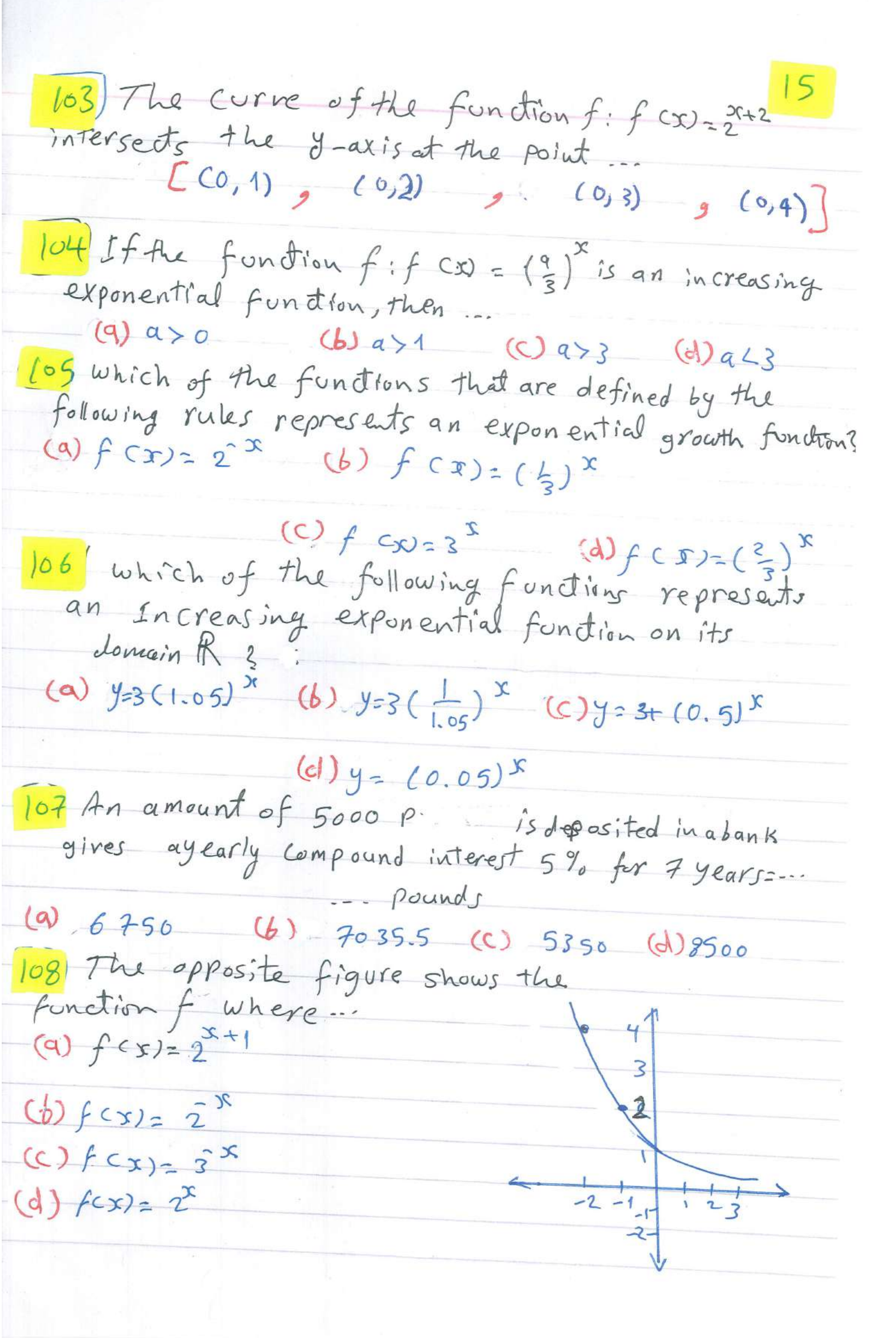
(a) -2 (b) 5 (c) 2 (d) 0

101 The length of the radius of the circum circle of the triangle ABC in which $a = 10$ cm. and $m(\angle A) = 30^\circ$ is ... cm

(a) 20 (b) 10 (c) 5 (d) $\frac{1}{5}$

102 $\lim_{x \to 0} \frac{1-\cos x}{\tan 2x} = \ldots$

(a) 1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) 0



103) The curve of the function $f: f(x) = 2^{x+2}$ intersects the y-axis at the point ...

[(0, 1) , (0, 2) , (0, 3) , (0, 4)]

104) If the function $f: f(x) = \left(\frac{a}{3}\right)^x$ is an increasing exponential function, then ...

(a) $a > 0$ (b) $a > 1$ (c) $a > 3$ (d) $a < 3$

105) which of the functions that are defined by the following rules represents an exponential growth function?

(a) $f(x) = 2^{-x}$ (b) $f(x) = \left(\frac{1}{3}\right)^x$

(c) $f(x) = 3^x$ (d) $f(x) = \left(\frac{2}{3}\right)^x$

106) which of the following functions represents an increasing exponential function on its domain $\mathbb{R}$?

(a) $y = 3(1.05)^x$ (b) $y = 3\left(\frac{1}{1.05}\right)^x$ (c) $y = 3 + (0.5)^x$

(d) $y = (0.05)^x$

107) An amount of 5000 p is deposited in a bank gives a yearly compound interest 5% for 7 years = ... pounds

(a) 6750 (b) 7035.5 (c) 5350 (d) 8500

108) The opposite figure shows the function f where ...

(a) $f(x) = 2^{x+1}$

(b) $f(x) = 2^{-x}$

(c) $f(x) = 3^{-x}$

(d) $f(x) = 2^x$

109) $\lim\limits_{x \to \sqrt{2}} \dfrac{x^5 - 4\sqrt{2}}{x^3 - 2\sqrt{2}} = \dots$

(a) $\frac{4}{3}$ (b) $\frac{\sqrt{2}}{3}$ (c) $\frac{5}{2}$ (d) $\frac{10}{3}$

110) In ΔABC, if $\dfrac{\sin A}{3} = \dfrac{2\sin B}{5} = \dfrac{\sin C}{4}$, then $a:b:c = \dots$

(a) 6 : 5 : 8 (b) 8 : 5 : 6 (c) 7 : 2 : 4 (d) 3 : 5 : 4

111) $\lim\limits_{x \to 0} \dfrac{\tan^2 2x}{6x^2} = \dots$

(a) $\frac{2}{9}$ (b) $\frac{2}{3}$ (c) $\frac{4}{3}$ (d) $\frac{4}{9}$

112) The function $f : f(x) = \begin{cases} kx^2 & , x \le 2 \\ 2x + k & , x > 2 \end{cases}$

is continuas at $x = 2$, then $k = \dots$

(a) $\frac{3}{2}$ (b) $\frac{3}{4}$ (c) $\frac{4}{3}$ (d) $\frac{2}{3}$

113) $\lim\limits_{x \to 3} \dfrac{x^2 - x - 6}{x^2 + x - 12} = \dots$

(a) $\frac{5}{7}$ (b) $\frac{1}{7}$ (c) -1 (d) -5

114) $\lim\limits_{x \to 0} \dfrac{2x + \sin 3x}{\tan 5x} = \dots$

(a) 5 (b) $\frac{6}{5}$ (c) 1 (d) zero

115) If r is the length of the radius of the circumcircle of the triangle XYZ, then $\dfrac{y}{2\sin Y} = \dots$

(a) $4r$ (b) $2r$ (c) r (d) $\frac{1}{2}r$

116) The number $5^{x+1} + 5^{x}$ is divisible by ---- for all natural values of x 17

(a) 7 (b) 6 (c) 13 (d) 17

117) If $2^{x} = 20$, $n < x < n+1$, n is an integer, then $n = \ldots$

(a) 1 (b) 2 (c) 3 (d) 4

118) The two curves of the two functions $f: f(x) = 2^{x}$ and $g: g(x) = 3^{x}$ intersects at $x = \ldots$

(a) −1 (b) 0 (c) 1 (d) 2

119) If f^{-1} is the inverse function of the function f, then....

(a) domain of f^{-1} = domain of f

(b) domain of f^{-1} = range of f

(c) range of f^{-1} = range of f

(d) range of f^{-1} = domain of f^{-1}

120) If the straight line $y = x$ intersects the one-to-one function f in the point $(2, 2)$, then it intersects the function f^{-1} in the point ....

(a) $(-2, 2)$ (b) $(2, 2)$ (c) $(-2, -2)$ (d) $(2, -2)$

121) If the function f^{-1} where $f^{-1} = \{(2, 2), (5, 6)\}$ is the inverse of the function f where $f = \{(4, 5), (a, 2)\}$, then $a - b = \ldots$

[zero, 1, −1, 2]

122) In the triangle ABC, $\cos A = \dots$ 18

(a) $\frac{a^2+b^2-c^2}{2ab}$ (b) $\frac{a^2+c^2-b^2}{2ab}$ (c) $\frac{c^2-a^2-b^2}{2ab}$ (d) $\frac{b^2+c^2-a^2}{2bc}$

123 $\lim_{x \to \infty} \frac{x^3+5}{x(2x^2+3)} = \dots$

(a) $\frac{5}{8}$ (b) 1 (c) $\frac{5}{3}$ (d) $\frac{1}{2}$

124 The length of the radius of the circumcircle of the triangle ABC in which $m(\angle A) = 30^\circ$ and $a = 10$ cm is ...

(a) 5 cm (b) 10 cm (c) 20 cm (d) 40 cm

125) If the function f where $f(x) = \begin{cases} \frac{x^2-1}{x-1} & , x \neq 1 \\ 2a & , x = 1 \end{cases}$

is continuous at $x = 1$, then $a = \dots$

(a) 2 (b) −2 (c) zero (d) 1

126 The measure of the greatest angle of the triangle whose side lengths are 3, 5, 7 is ...

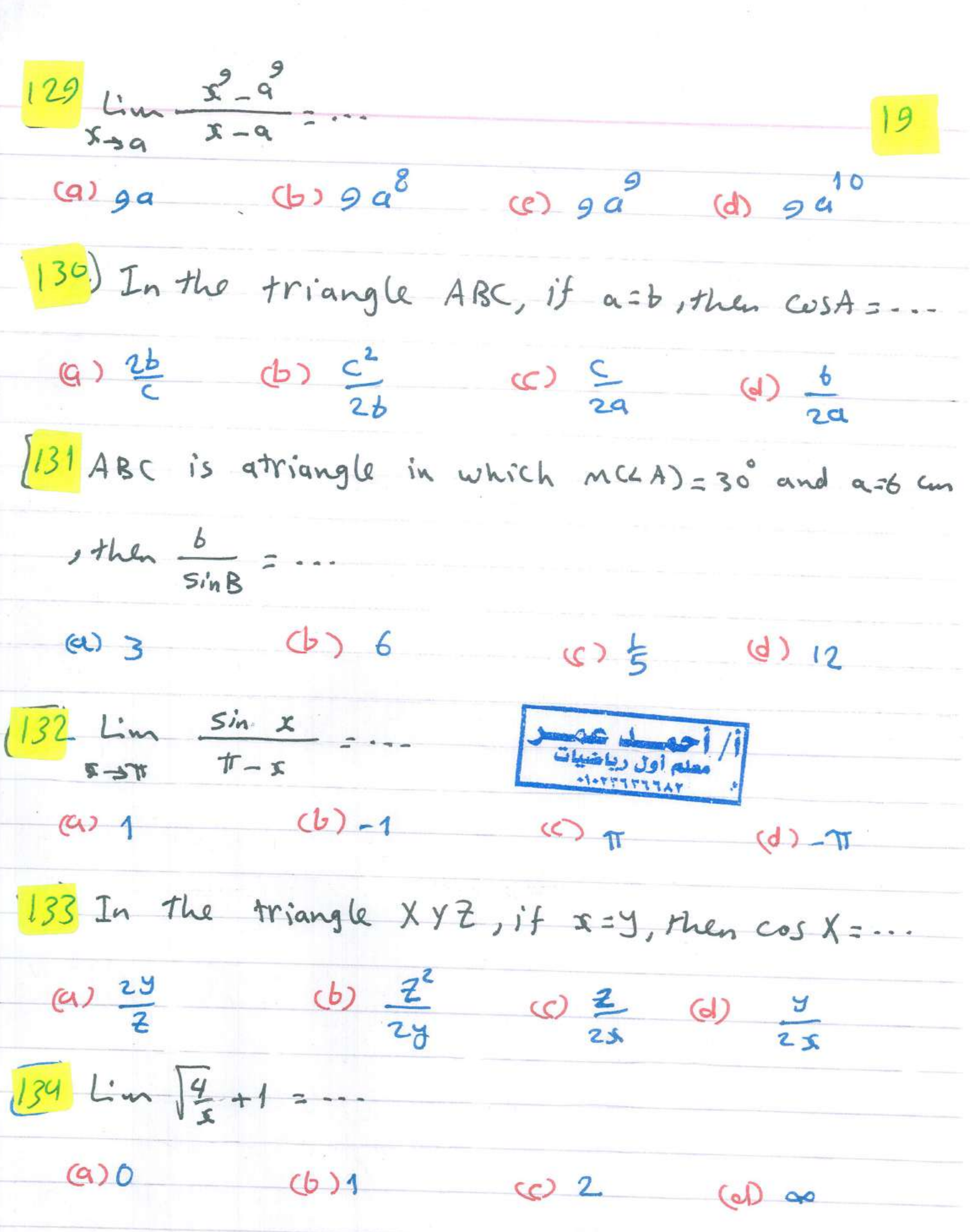
(a) 150° (b) 120° (c) 60° (d) 30°

127) $\lim_{x \to 0} \frac{2x + 3\sin x}{\tan 5x} = \dots$

(a) 5 (b) $\frac{6}{5}$ (c) 1 (d) zero

128 In ΔABC, $\frac{a}{a+c} = \dots$

(a) $\frac{\sin A}{\sin B}$ (b) $\frac{\sin A}{\sin C}$ (c) $\frac{\sin A}{\sin A + \sin B}$ (d) $\frac{\sin A}{\sin A + \sin C}$



129 $\lim\limits_{x \to a} \frac{x^9 - a^9}{x - a} = \dots$

(a) $9a$ (b) $9a^8$ (c) $9a^9$ (d) $9a^{10}$

130) In the triangle ABC, if $a = b$, then $\cos A = \dots$

(a) $\frac{2b}{c}$ (b) $\frac{c^2}{2b}$ (c) $\frac{c}{2a}$ (d) $\frac{b}{2a}$

131 ABC is a triangle in which $m(\angle A) = 30^\circ$ and $a = 6$ cm, then $\frac{b}{\sin B} = \dots$

(a) 3 (b) 6 (c) $\frac{1}{5}$ (d) 12

132 $\lim\limits_{x \to \pi} \frac{\sin x}{\pi - x} = \dots$

(a) 1 (b) -1 (c) π (d) $-\pi$

133 In the triangle XYZ, if $x = y$, then $\cos X = \dots$

(a) $\frac{2y}{z}$ (b) $\frac{z^2}{2y}$ (c) $\frac{z}{2x}$ (d) $\frac{y}{2x}$

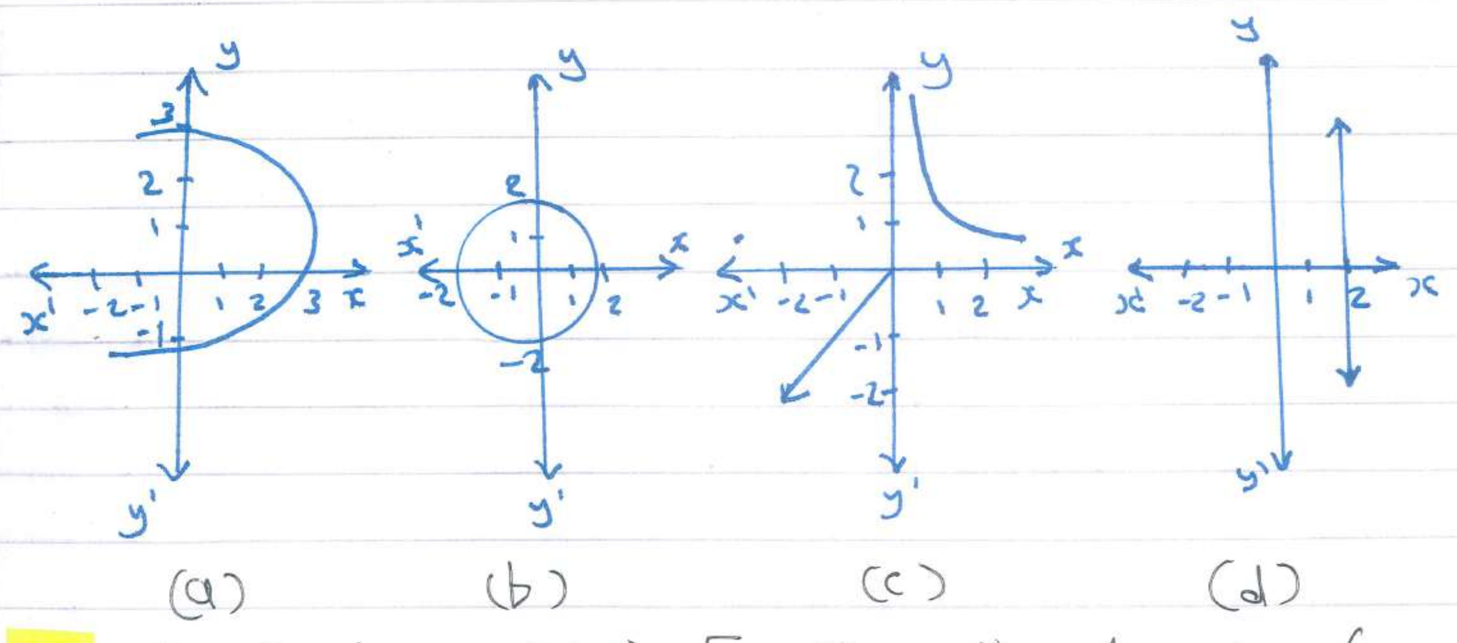
134 $\lim \sqrt{\frac{4}{x} + 1} = \dots$

(a) 0 (b) 1 (c) 2 (d) ∞

135 If r is the length of the radius of the circumcircle of $\triangle ABC$, then $\frac{2b}{\sin B} = \dots$

(a) r (b) $2r$ (c) $\frac{1}{2}r$ (d) $4r$

136 Which of the following figures represents of function of x ?



137 $f(x) = \frac{1}{x}$, $g(x) = \sqrt{x}$, then the domain of $(f \circ g) = \dots$

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R}$ (c) $\mathbb{R}^+$ (d) $[0, \infty[$

138 If f is an even function in the interval $[a, b]$ then $b = \dots$

(a) a (b) $-a$ (c) $2a$ (d) a^3

$g(x) = x^2$ ~~+4~~

139 The curve of the function $f : f(x) = x^2 + 4$ is the same of the function $g : g(x)$ by translation of a magnitude 4 units in direction of ...

(a) $\overrightarrow{ox}$ (b) $\overrightarrow{ox'}$ (c) $\overrightarrow{oy}$ (d) $\overrightarrow{oy'}$

140 The domain of the function $f : f(x) = \frac{5}{\sqrt{x-4}}$ is

(a) $[4, \infty[$ (b) $]4, \infty[$ (c) $]-\infty, 4]$ (d) $]-\infty, -4[$



141 In The opposite figure:
At $\theta \to \frac{\pi}{2}$, then: $y \to$ ... cm

y
10 cm
θ
10 Cm

(a) Zero (b) 5
(c) 10 (d) $10\sqrt{2}$

142 $\lim_{x \to 3} \frac{x^2 - 9}{x - 3} = \dots$

(a) -6 (b) Zero (c) 3 (d) 6

143 $\lim_{x \to a} \frac{x^n - a^n}{x^m - a^m} = \dots$

(a) $\frac{m}{n}$ (b) $\frac{m}{n}(a)^{m-n}$
(c) $\frac{n}{m}(a)^{m-n}$ (d) $\frac{n}{m}(a)^{n-m}$

144 $\lim_{x \to 3} \frac{x^3 - 27}{x^2 - 9} = \dots$

(a) $\frac{3}{2}$ (b) $4\frac{1}{2}$ (c) 3 (d) 27

145 $\lim_{x \to \infty} \frac{x^3 + 5}{x(2x^2 + 3)} = \dots$

(a) $\frac{5}{8}$ (b) 1 (c) $\frac{1}{2}$ (d) $\frac{5}{3}$

146 $\lim_{x \to 9} \frac{3 - \sqrt{x}}{27 - \sqrt{x^3}} = \dots$

(a) $\frac{1}{9}$ (b) $\frac{1}{27}$ (c) 3 (d) $-\frac{1}{27}$

147) The symmetric point of the function f: $f(x) = (x-2)^3 + 1$ is ...

(a) $(2, 1)$ (b) $(-2, 1)$ (c) $(2, -1)$ (d) $(-2, -1)$

148) $f(x) = \frac{1}{x}$, then the symmetric point of the function whose rule $g(x) = f(x+1)$ is ...

(a) $(1, 0)$ (b) $(0, 1)$

(c) $(-1, 0)$ (d) $(-1, 1)$

149 The curve of $f: f(x) = |x+3|$ is the same curve of $g: g(x) = |x|$ by translation of magnitude 3 units in direction ...

(a) $\overrightarrow{ox}$ (b) $\overrightarrow{ox'}$

(c) $\overrightarrow{oy}$ (d) $\overrightarrow{oy'}$

150 The domain of the function $f: f(x) = \frac{1}{|x|-3}$ is

(a) $\{3, -3\}$ (b) $[-3, 3]$

(c) $\mathbb{R} - [-3, 3]$ (d) $\mathbb{R} - \{-3, 3\}$

151) The solution set of the equation: $|x-3| + 1 = 0$ in $\mathbb{R}$ is ...

(a) $\mathbb{R}$ (b) $\{-1\}$ (c) ϕ (d) $\{4\}$

152) The product of the two roots of the equation: $x^2 - 3|x| - 10 = 0$ equals ...

(a) -25 (b) -15 (c) 10 (d) 25

153 If $f(x) = \begin{cases} \dfrac{x^8 - a^8}{x^5 - a^5} & , x \neq a \\ 200 & , x = a \end{cases}$

is continuous at $x = a$, then $a = \ldots$

(a) 5 (b) $\frac{8}{5}$ (c) 125 (d) $\frac{1}{5}$

154 which of the following functions has no limit at $x = 1$?

155 $\lim\limits_{x \to 0} \dfrac{(x+h)^5 - x^5}{h} = \ldots$

(a) x^5 (b) $5x^4$ (c) zero (d) 1

156 If $n(x)$ is a function and $\lim\limits_{x \to 2} \dfrac{n(x) - 8}{x - 2} = 7$,

then $\lim\limits_{x \to 2} \dfrac{2x^2 - n(x)}{x - 2} = \ldots$

(a) 1 (b) 4 (c) 8 (d) 15



157 If f is an odd function in the interval $[a, b]$, then $b = \dots$

(a) a (b) $-a$ (c) $2a$ (d) a^3

158 The opposite figure represents a function of x whose domain is

(a) $\mathbb{R}$ (b) $\mathbb{R} -]-2, 2[$

(c) $\mathbb{R} - [-2, 2]$ (d) $\mathbb{R} - \{0\}$

159 $f(x) = x + 1$, $g(x) = x^2$, then $(f \circ g)(2) = \dots$

(a) 3 (b) 4 (c) 5 (d) 9

160 The domain of the function $f : f(x) = \dfrac{5}{\sqrt[3]{x - 8}}$ is

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{8\}$ (d) $[8, \infty[$

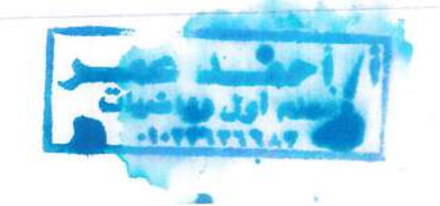
161 The function which is one-to-one from the following functions defined by the rules is...

(a) $f_1(x) = x + 2$ (b) $f_2(x) = x^2$

(c) $f_3(x) = |x|$ (d) $f_4(x) = 5$

162 The area bounded between the two curves of the functions $f : f(x) = |x + 3| - 2$, $g(x) = $ zero is ... area units

(a) 2 (b) 3 (c) 4 (d) 5



163: From the following functions, the one-to-one function is ...

(a) $f_1(x) = x + 2$ (b) $f_2(x) = x^2$ (c) $f_3(x) = |x|$
(d) $f_4(x) = 5$

164 If $f(x) = 3x + 1$, $g(x) = x^3$, then $(g \circ f)(x) = ...$

(a) $3x^4 + x^3$ (b) $(3x+1)^3$ (c) $3x^3 + 1$ (d) $x^3 + 3x + 1$

165 The inverse function of $f(x) = x + 2$ is $f^{-1}(x) = ...$

(a) $x + 2$ (b) $-x + 2$ (c) $x - 2$ (d) $\frac{x}{2}$

166 If $\log_x 4 = 2$, then $x = ...$

(a) 4 (b) ± 2 (c) 2 (d) -2

167 If $f(x) = x + 1$ and $g(x) = x^2$, then $(f \circ g)(2) = ...$

(a) 3 (b) 4 (c) 9 (d) 5

168 If $\log_x 4 = 2$, then $x = ...$

(a) 4 (b) ± 2 (c) 2 (d) -2

169 If $5^{x-1} = 3^{1-x}$, then $x = ...$

(a) 1 (b) 2 (c) 3 (d) 5

170 If f is an odd function on $[-x, x]$, then $f(-x) + f(x) = ...$

(a) $2x$ (b) $-2x$ (c) 0 (d) undefined

171 Graph the function f where $f(x)=\frac{1}{x-1}+2$ 27
then from the graph determine its range and deduce it monotony.

Solution

the point of symmetry is $(1,2)$

Range $= \mathbb{R}-\{2\}$

The function is decreasing on $]0,\infty[$, $]-\infty,0[$
The function neither even nor odd.

172 Find the domain of $f \circ g$:

① $f(x)=\frac{x}{\sqrt{1-x}}$ ② $g(x)=\frac{x-1}{x^2-x}+\frac{1}{x+1}$

solution:

1) $1-x>0 \Rightarrow -x>-1 \Rightarrow x<1$
Domain $=]-\infty,1[$

2)

$x^2-x=0 \Rightarrow x(x-1)=0 \Rightarrow x=0,\ x=-1$
, $x+1=0 \Rightarrow x=-1$

Domain $=\mathbb{R}-\{0,1,-1\}$

173 Draw the graph of the functions f, g :

① $f(x) = \sqrt{x^2 - 4x + 4}$, $g(x) = |x^2 - 4x + 5|$, $x \in [0, 4]$

then deduce its Range and discuss its Monotonicity

Solution :

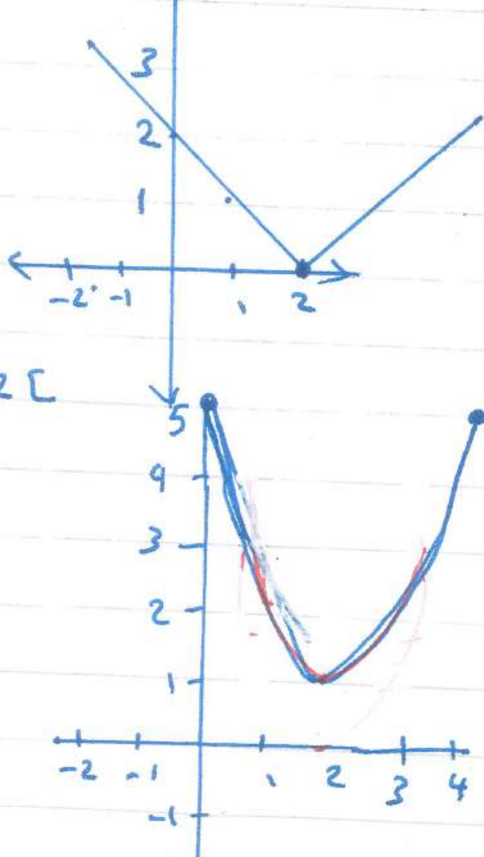
① $f(x) = \sqrt{(x-2)^2} = |x-2|$

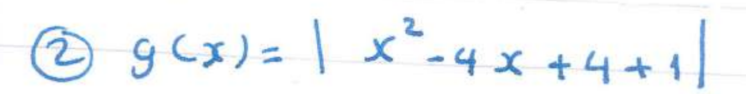
point of symmetry $(2, 0)$

Range = $[0, \infty[$

the function is decreasing on $]-\infty, 2[$

, increasing on $]2, \infty[$





② $g(x) = | x^2 - 4x + 4 + 1 |$

$= | (x-2)^2 + 1 |$

$= (x-2)^2 + 1$

point of symmetry is $(2, 1)$

Range = $[1, 5[$

the function is decreasing on $]0, 2[$

, increasing on $]2, 4[$

174 Find: $\lim\limits_{x \to 0} \dfrac{x^2 + \sin 3x}{5x \cos 2x}$

Solution:

$$\lim_{x \to 0} \frac{x^2 + \sin 3x}{5x \cos 2x} = \lim_{x \to 0} \frac{x\left(x + \frac{\sin 3x}{x}\right)}{x(5 \cos 2x)}$$

$$= \lim_{x \to 0} \frac{x + \frac{\sin 3x}{x}}{5 \cos 2x} = \frac{0 + 3}{5} = \frac{3}{5}$$

175 Solve the triangle ABC in which $a = 9$ cm, $b = 15$ cm, $m(\angle C) = 106°$

Solution:

$a = 9$ cm, $b = 15$ cm, $m(\angle C) = 106°$

$$c^2 = a^2 + b^2 - 2ba \cos c$$

$$= 81 + 225 - 2 \times 9 \times 15 \cos 106 \simeq 380.42$$

$\Rightarrow c = 19.5$ cm

$$\sin A = \frac{b^2 + c^2 - a^2}{2bc} = \frac{(15)^2 + (19.5)^2 - (9)^2}{2 \times 15 \times 19.5} \simeq 0.896$$

$\Rightarrow m(\angle A) = 26° \; 18' \; 17.88''$

, $m(\angle B) = 108 - (26° \; 18' \; 17.88'' + 106) = 47° \; 41' \; 42.12''$

176 Find: $\lim\limits_{x \to -2} \dfrac{(x+3)^5 - 1}{x^2 - 4}$

$$= \lim_{x+3 \to +1} \frac{(x+3)^5 - 1}{(x-2)(x+2)} = \lim_{x+3 \to 1} \frac{(x+3)^5 - 1}{(x-2)((x+3)-1)}$$

$$= \frac{1}{-4} \times \frac{5}{1} (1)^{5-1} = \frac{-1}{4} \times 5 = -\frac{5}{4}$$

177) Tell whether each of the functions defined by the following rules is odd, even or otherwise. 30

① $f_1(x) = x \cos x$ ② $f_2(x) = \begin{cases} x^2 , & x \geq 0 \\ |x| , & x < 0 \end{cases}$

③ $f_3(x) = x^2 |x| - 1$

Solution:

① $f_1(-x) = (-x)\cos(-x)$

$= -x \cos x = -f_1(x)$

$\therefore f_1(x)$ is odd function.

② $f_2(-x) = \begin{cases} (-x)^2 , & -x \geq 0 \\ |-x| , & -x < 0 \end{cases}$

$= \begin{cases} x^2 , & x \leq 0 \\ |x| , & x > 0 \end{cases}$

$\neq f_2(x) \neq f_2(-x)$

$f_2(x)$ ~~niegther~~ even nor odd.

③ $f_3(-x) = (-x)^2 |-x| - 1$

$= x^2 |x| - 1$

$= f(x)$

$f(x)$ is even function.

178 ABCD is aquadrilateral in which AB = 27 Cm., BC = 12 Cm., CD = 8 Cm., DA = 12 Cm., AC = 18 cm. prove that $\overrightarrow{AC}$ bisects ∠BAD, then find the area of the shape ABCD 31

Solution:

In Δ ABC

12 cm, A, D, 18 cm, 8 cm, 27 cm, C, 12 cm, B

$$\cos(B\hat{A}C) = \frac{(27)^2 + (18)^2 - (12)^2}{2 \times 27 \times 18}$$

$m(\angle BAC) = 20° \; 44' \; 30.9''$

In Δ ADC

$$\cos(\angle DAC) = \frac{(12)^2 + (18)^2 - (8)^2}{2 \times 12 \times 18}$$

$\Rightarrow m(\angle DAC) = 20° \; 44' \; 30.9''$

$\Rightarrow \because m(\angle DAC) = m(\angle BAC)$

$\therefore \overrightarrow{AC}$ bisects ∠BAD (first)

the area of ABCD = the area of ΔABC + the area of Δ ADC

$= \frac{1}{2} \times 27 \times 18 \times \sin 20° 44' 30.9'' +$

$\frac{1}{2} \times 18 \times 12 \sin 20' 44' 30.9''$

$\simeq 124 \text{ Cm}^2$

179 Find in $\mathbb{R}$ s.s of each of the following

① $|x| + x = 0$ ② $|2x-3| - |6-4x| > 0$

Solution:

①

$x \geq 0$	$x < 0$
$x + x = 0$	$-x + x = 0$
$2x = 0$	$0 = 0$
$x = 0$	$\forall x \in]-\infty, 0[$

$S.S =]-\infty, 0]$

② $|2x-3| - |4x-6| > 0$

$\Rightarrow |2x-3| - 2|x-3| > 0$

$-|2x-3| > 0$

$\Rightarrow |2x-3| < 0$ Refused

$S.S = \phi$

180 without using Calculator find the value of:

$$\text{Log } 25 + \frac{\text{Log } 8 \times \text{Log } 16}{\text{Log } 64}$$

Solution:

$$= \text{Log } 25 + \frac{\text{Log } 2^3 \times \text{Log } 2^4}{\text{Log } 2^6}$$

$$= \text{Log } 25 + \frac{3 \text{ Log } 2 \times 4 \text{ Log } 2}{6 \text{ Log } 2} = \text{Log } 25 + 2 \text{ Log } 2$$

$= \text{Log } 25 + \text{Log } 4$

$= \text{Log } 100 = 2$

181 Find (1) $\lim_{x \to 0} \frac{\sqrt{x+4} - 2}{x^2 + x}$ (2) $\lim_{x \to \infty} \frac{1}{x}\sqrt{3+4x^2}$

Solution:

(1) $\lim_{x \to 0} \frac{\sqrt{x+4} - 2}{x^2+x} \times \frac{\sqrt{x+4} + 2}{\sqrt{x+4} + 2}$

$= \lim_{x \to 0} \frac{(x+4-4)}{(x^2+x)(\sqrt{x+4}+2)}$

$= \lim_{x \to 0} \frac{x}{x(x+1)(\sqrt{x+4}+2)}$

$= \lim_{x \to 0} \frac{1}{(x+1)(\sqrt{x+4}+2)} = \frac{1}{4}$

---

(2)

$\lim_{x \to \infty} \frac{1}{x}\sqrt{3+4x^2} = \lim_{x \to \infty} \sqrt{\frac{3}{x^2} + \frac{4x^2}{x^2}}$

$= \lim_{x \to \infty} \sqrt{\frac{3}{x^2} + 4}$

$= \sqrt{0+4} = 2$

أ/ أحمد عمر
معلم أول رياضيات
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182 If : $f(x) = x^2 - 1$, $g(x) = x + 1$
graph the Curve of the function $\frac{f}{g}$,

From the graph, deduce the domain and the range , then investigate its monotony.

Solution:

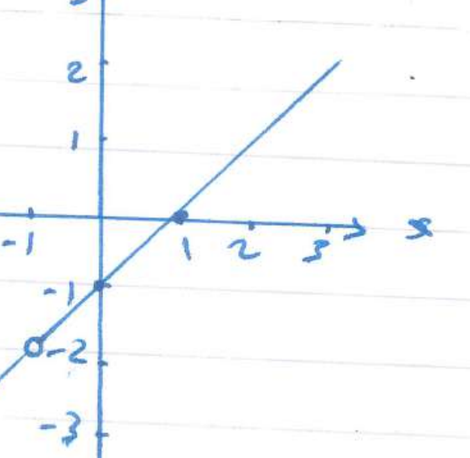
the Domain of f is $\mathbb{R}$
the ~~Range~~ of g is $\mathbb{R}$

the Domain of $\frac{f}{g}$ is $\mathbb{R} - \{-1\}$

$(\frac{f}{g})(x) = \frac{x^2 - 1}{x + 1} = \frac{(x-1)(x+1)}{x+1} = x - 1$

the rang $= \mathbb{R} - \{-2\}$

The function is increasing on $\mathbb{R} - \{-1\}$



183

If the perimeter of aregular pentagon is 30 cm. find its surfuce area.

Solution

E 6 cm A
6 cm 6 cm
108 B
D 6 cm 6 cm
C

In Δ ABC

from cosin rule

$(AC)^2 = (AB)^2 + (BC)^2 - 2 AB \times BC \cos(\angle ABC)$

$= 6^2 + 6^2 - 2 \times 6 \times 6 \cos 108 \doteq 94.25$

$\Rightarrow AC = 9.7$ cm

Area of the pentagon =

2 Area of (Δ ABC) + Area of Δ (ACE)

$2 \times \frac{1}{2} \times 6 \times 6 \sin 108 + \frac{1}{2} \times 9.7 \times 9.7 \times \sin 36$

$\simeq 62$ cm^2

184 If the function f where $f(x) = \frac{1}{x}$, find the range of the function f, the two coordinates of the symmetry point of the curve, then find in $\mathbb{R}$ the solution set of the equation $f(\frac{1}{x}) = 4$ 36

Solution:

Range $= \mathbb{R} - \{0\}$ the two coordinates are $x = 0$, $y = 0$

$f(\frac{1}{x}) = 4$

$\Rightarrow x = 4$ $\quad$ S.S $= \{4\}$

185 graph the curve of the function f where

$$f(x) = \begin{cases} x^2 & \text{when } -5 \le x < 2 \\ 6 - x & \text{when } 2 \le x \le 8 \end{cases}$$

From the graph, determine the range of the function and Investigate its monotony.

Solution:

range $= [-2, 25]$

the function is decreasing on each of $]-5, 0[$, $]2, 8[$

, increasing on $]0, 2[$

186 Find :

(1) $\lim_{x \to \infty} \frac{4-3x^2}{\sqrt{x^4+5}}$ (2) $\lim_{x \to 3} \frac{\sqrt{x+1}-2}{x-3}$

Solution :

(1) $\lim_{x \to \infty} \frac{4-3x^2}{\sqrt{x^4+5}} = \lim_{x \to \infty} \frac{\frac{4}{x^2} - \frac{3x^2}{x^2}}{\sqrt{\frac{x^4}{x^4} + \frac{5}{x^4}}} = \frac{0-3}{\sqrt{1+0}} = \frac{3}{1} = 3$

(2) $\lim_{x \to 3} \frac{\sqrt{x+1}-2}{x-3}$

$= \lim_{x+1 \to 4} \frac{(x+1)^{\frac{1}{2}} - 4^{\frac{1}{2}}}{(x+1)-4} = \frac{1}{2}(4)^{\frac{1}{2}-1} = \frac{1}{4}$

187 Find the perimeter of ΔABC in which $a = 8$ cm., $b = 6$ cm. , $m(\angle C) = 48°$

Solution:

$c^2 = a^2 + b^2 - 2ab \cos C$

$= 8^2 + 6^2 - 2 \times 8 \times 6 \cos 48 = 35.76$

$\Rightarrow c = 5.98$ cm

perimeter of $\Delta ABC = a + b + c = 6 + 8 + 5.98$

$\simeq 19.98$ cm

188 Find:

(1) $\lim_{x \to \infty} \frac{5x^4 + 3x^2 - 8}{2x + x^4}$ (2) $\lim_{x \to -2} \frac{x+2}{x-3}$

Solution:

(1) $$\lim_{x\to\infty} \frac{\frac{5x^4}{x^4}+\frac{3x^2}{x^4}-\frac{6}{x^4}}{\frac{2x}{x^4}+\frac{x^4}{x^4}} = \frac{5+0-0}{0+1} = \frac{5}{1} = 5$$

(2) $$\lim_{x\to -2} \frac{x+2}{x-3} = \frac{-2+2}{-2-3} = \frac{0}{-5} = 0$$

(189) If ABC is a triangle in which

$\frac{1}{2}\sin A = \frac{1}{3}\sin B = \frac{1}{4}\sin C$, find the measure of its largest angle.

Solution:

$$\frac{\sin A}{2} = \frac{\sin B}{3} = \frac{\sin C}{4}$$

$a = 2k$, $b = 3k$, $c = 4k$

the largest angle is C

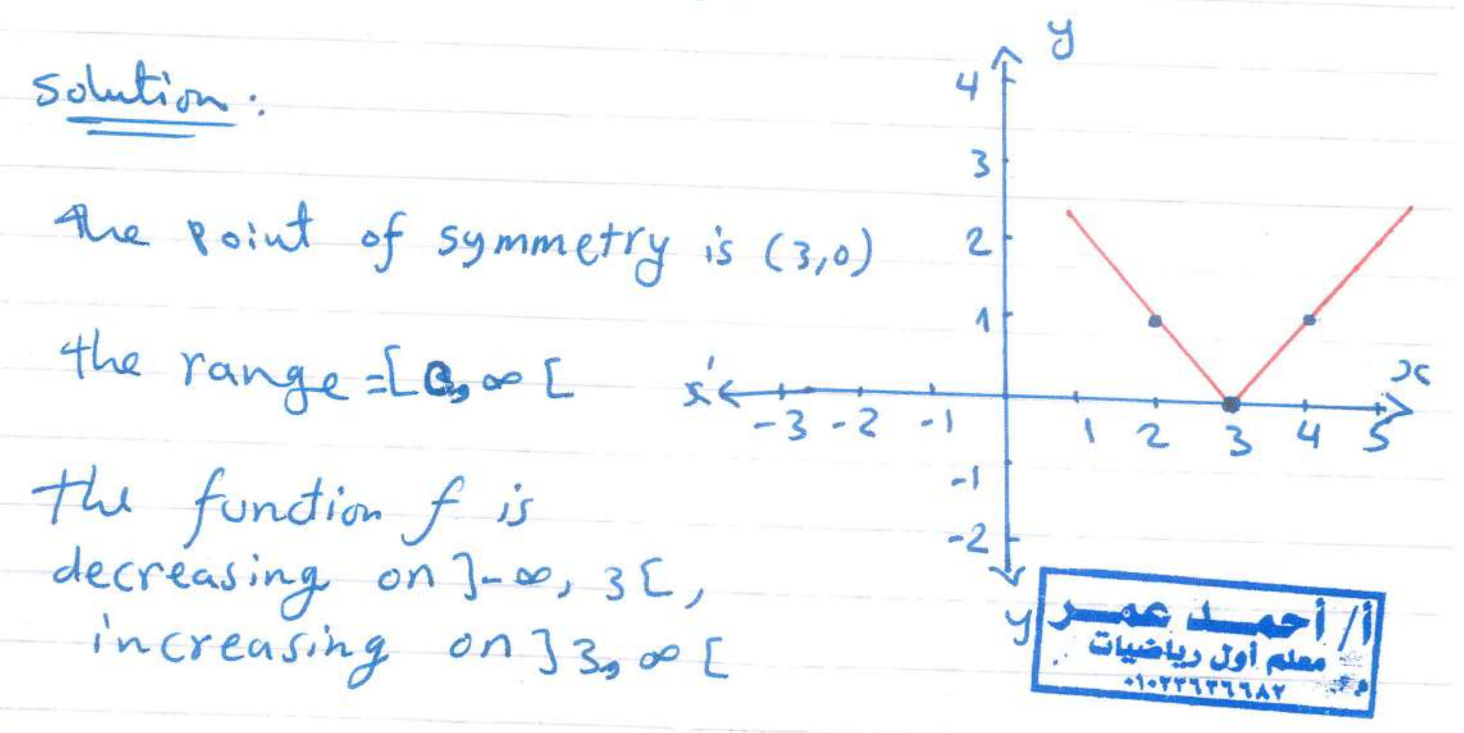
$$\cos C = \frac{a^2+b^2-c^2}{2ab} = \frac{4k^2+9k^2-16k^2}{2\times 2k\times 3k}$$

$$= \frac{-3k^2}{12k^2} = -\frac{1}{4}$$

$\Rightarrow m(\angle C) = 104^\circ\ 28'\ 39''$

190) Graph the curve of the function f where **38**
$f(x) = |x-3|$, deduce the range and the monotony of the function and tell whether it is even, odd or otherwise.

Solution:



The point of symmetry is $(3, 0)$

the range $= [0, \infty[$

the function f is
decreasing on $]-\infty, 3[$,
increasing on $]3, \infty[$

the function niether even nor odd

191) Find the solution set for each of the following in $\mathbb{R}$:

① $|x-3| \geq 5$ ② $|x-3| = 0$

Solution:

① $|x-3| \geq 5$

$x \geq 3$	$x < 3$
$x - 3 \geq 5$	$x - 3 \leq -5$
$x \geq 8$	$x \leq -2$

$S.S = \mathbb{R} -]-2, 8[$

② $|x-3| = 0$

$x - 3 = 0$

$x = 3$

$S.S. = \{3\}$

192) Find the Solution set for each of the following in $\mathbb{R}$: 40)

① $\log x = \log 3 + \log 10$ ② $9^x - 3 \times 3^x = 0$

Solution:

① $\log x = \log (3 \times 10)$

$\log x = \log 30$

$\Rightarrow x = 30$ $S.S = \{30\}$

② $9^x - 3 \times 3^x = 0$

$\Rightarrow 3^{2x} - 3 \times 3^x = 0$

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$3^x (3^x - 3) = 0$

$\Rightarrow 3^x = 0$ or $3^x - 3 = 0$

x is undefined

$3^x = 3$

$x = 1$

$S.S = \{1\}$

193) without using Calculator, find in the simplest form the Value of: $\frac{1}{\log_2 30} + \frac{1}{\log_3 30} + \frac{1}{\log_5 30}$

Solution:

expression $= \frac{\log 2}{\log 30} + \frac{\log 3}{\log 30} + \frac{\log 5}{\log 30}$

$= \frac{\log 2 + \log 3 + \log 5}{\log 30} = \frac{\log(2 \times 3 \times 5)}{\log 30} = \frac{\log 30}{\log 30} = 1$

194 Find

(1) $\lim_{x \to 3} \frac{x^2 - 6x + 9}{x - 3}$ (2) $\lim_{x \to 2} \frac{2x^2 - 8}{x - 2}$

Solution:

① $\lim_{x \to 3} \frac{(x-3)^2}{(x-3)} = \lim_{x \to 3} (x-3) = 0$

② $\lim_{x \to 2} \frac{2(x^2-4)}{x-2} = \lim_{x \to 2} \frac{2(x-2)(x+2)}{(x-2)}$

$= \lim_{x \to 2} 2(x+2) = 8$

195) Find the diameter length of the circumcircle of ΔABC in each of the following cases:

(1) $m(\angle A) = 75°$, $a = 21$ cm

(2) $m(\angle B) = 50°$, $m(\angle C) = 65°$, $c - b = 6$ cm

Solution:



①

$\frac{a}{\sin A} = 2r$

$\Rightarrow d = 2r = \frac{21}{\sin 75} \simeq 21.7$ cm

② $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2r$

$\Rightarrow \frac{c-b}{\sin C - \sin B} = 2r$

$\Rightarrow d = 2r = \frac{6}{\sin 65 - \sin 50} = 42.8$ cm

196 Reduce:

(1) $\frac{4^{2n+1} \times 2^{1-n}}{8^{n+2}}$ (2) $\log_6 54 - \log_6 9$

Solution:

(1) $\frac{(2^2)^{2n+1} \times 2^{1-n}}{(2^3)^{n+2}} = \frac{2^{4n+2} \times 2^{1-n}}{2^{3n+6}}$

$= 2^{4n+2+1-n-3n-6}$

$= 2^{-3} = \frac{1}{8}$

(2) $\log_6 54 - \log_6 9$

$= \log_6 \frac{54}{9} = \log_6 6 = 1$

197 tell whether each of the functions defined by the following rules is odd or even:

(1) $f(x) = x + \sin x$ (2) $f(x) = x^3 - 2x^2$

Solution:

(1) $f(-x) = (-x) + \sin(-x)$

$= -x - \sin x$

$= -(x + \sin x) = -f(x)$ f is odd function

(2) $f(-x) = (-x)^3 - 2(-x)^2$

$= -x^3 - 2x^2 \neq f(x)$

$-(x^3 + 2x^2) \neq -f(x)$

the function niether even nor odd

198) Find the value of the following:

(1) $\lim_{x \to 3} \frac{(x-6)^2-9}{x^2-9}$ (2) $\lim_{x \to -1} \frac{2x^3-x^2-2x+1}{x^3+1}$

Solution

① $\lim_{x \to 3} \frac{(x-6+3)(x-6-3)}{(x-3)(x+3)}$

$= \lim_{x \to 3} \frac{(x-3)(x-9)}{(x-3)(x+3)} = \lim_{x \to 3} \frac{x-9}{x+3} = \frac{3-9}{3+3} = \frac{-6}{6} = -1$

② $\lim_{x \to -1} \frac{(x+1)(2x^2-3x+1)}{(x+1)(x^2-x+1)}$

$x+1 \;\big|\; 2x^3-x^2-2x+1$

$2x^2-3x+1$

$\mp 2x^3 \mp 2x^2$

$-3x^2-2x+1$

$\pm 3x^2 \pm 3x$

$x+1$

$\mp x \mp 1$

00

$= \lim_{x \to -1} \frac{2x^2-3x+1}{x^2-x+1}$

$= \frac{2(-1)^2-3(-1)+1}{(-1)^2-(-1)+1} = \frac{6}{3} = 2$

199) ABC is atriangle in which $m(\angle A) = 36°$, $m(\angle C) = 45°$ and $b = 9$ cm, Find the area of the circumcircle of the triangle.

Solution:

$m(\angle B) = 180 - (36+45) = 99°$

$2r = \frac{b}{\sin B} = \frac{9}{\sin 99} = 9.11 \Rightarrow r = 4.56$ cm

area of circle $= \pi r^2 = 3.14 \times (4.56)^2 \simeq 65.2$ cm^2

200 If $f(x) = |x-3| + |x+2|$, prove that:
$f(2) = f(-1)$

Solution:

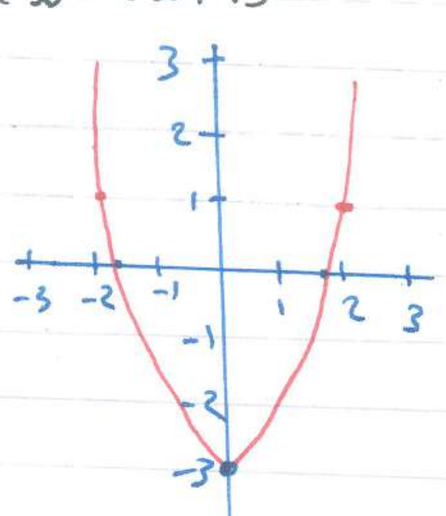
$$f(2) = |2-3| + |2+2| = 1+4 = 5$$

$$f(-1) = |-1-3| + |-1+2| = 4+1 = 5$$

$\therefore f(2) = f(-1)$

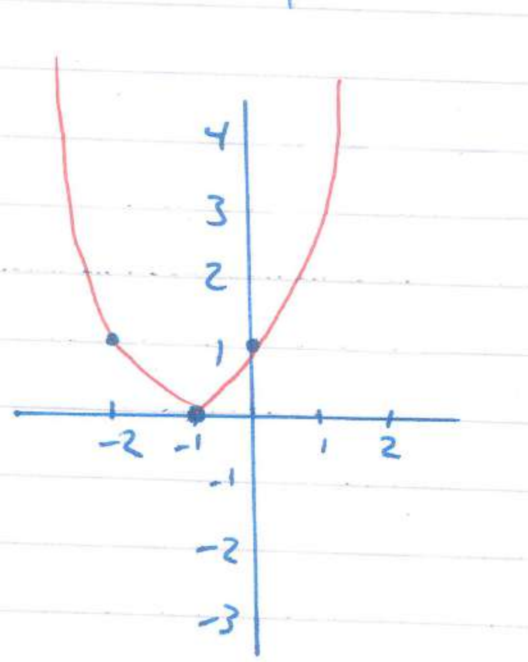
201 Use the curve of the function f where $f(x) = x^2$ to graph the following functions:
(1) $f_1 : f_1(x) = x^2 - 3$ (2) $f_2 : f_2(x) = (x+1)^2$

Solution:



① the point of symmetry of f_1 is $(0, -3)$

② the point of symmetry of f_2 is $(-1, 0)$





202 Find :

(1) $\lim_{x \to 2} \frac{x^5 - 32}{x - 2}$ (2) $\lim_{x \to 1} \frac{(x-2)^4 - 1}{x - 1}$

Solution:

① $\lim_{x \to 2} \frac{x^5 - 2^5}{x - 2} = \frac{5}{1}(2)^{5-1} = 80$

② $\lim_{x \to 1} \frac{(x-2)^4 - 1}{(x-2) + 1}$



$= \lim_{x-2 \to -1} \frac{(x-2)^4 - (-1)^4}{(x-2) - (-1)} = \frac{4}{1}(-1)^{4-1} = -4$

203 ABCD is aparallelogram in which AB = 7 cm, the two diagonals $\overline{AC}$ and $\overline{BD}$ form two angles of measurements 65° and 28° with $\overline{AB}$ respectively, find the lengths of $\overline{BD}$ and $\overline{AC}$

Solution:

D, C, M, A, B, 65°, 28°, 7 Cm

$m(\angle AMB) = 180 - (28^\circ + 65^\circ) = 87^\circ$

from sine rule:

$\frac{MB}{\sin 65} = \frac{MA}{\sin 28} = \frac{7}{\sin 87}$

$MB = \frac{7 \sin 65}{\sin 87} = 6.35 \Rightarrow DB = 2MB = 12.7$ Cm

$MA = \frac{7 \sin 28}{\sin 87} = 3.29 \Rightarrow AC = 2AM = 6.58$ Cm

204 Find the solution set of each of the following equations in $\mathbb{R}$:

(1) $\log_2 x + \log_2 (x+1) = 1$ (2) $3^x + 3^{1+x} = 36$

Solution:

(1) $\log_2 x(x+1) = 1$



$\Rightarrow x(x+1) = 2^1$

$\Rightarrow x^2 + x - 2 = 0$

$(x-1)(x+2) = 0$

$x = 1$ or $x = -2$ refused

$S.S = \{1\}$

(2) $3^x + 3^{1+x} = 36$

$3^x(1+3) = 36$

$4 \times 3^x = 36$ $\div 4$

$3^x = 9$

$3^x = 3^2$

$x = 2$

$S.S = \{2\}$

205) Find:

(1) $\lim_{x \to 3} \frac{x^3 - 27}{x^2 - 9}$ (2) $\lim_{x \to \infty} \frac{4x^2+1}{x^2-2}$

Solution:

(1) $\lim_{x \to 3} \frac{x^3 - 3^3}{x^2 - 3^2} = \frac{3}{2}(3)^{3-2} = \frac{9}{2}$

(2) $\lim_{x \to \infty} \frac{\frac{4x^2}{x^2} + \frac{1}{x^2}}{\frac{x^2}{x^2} - \frac{2}{x^2}} = \frac{4+0}{1-0} = \frac{4}{1} = 4$

206 ABCD is aquadrilateral in which AB = 9 cm., BC = 5 cm. CD = 8 cm., DA = 9 cm. and AC = 11 cm prove that ABCD is asyclic quadrilateral.

Solution:

9 cm
A
9 cm
D
11 cm
B
8 cm
5 cm
C

In Δ ABC

$\cos(\angle B) = \frac{5^2 + 9^2 - 11^2}{2 \times 5 \times 9} = -\frac{1}{6}$

$\Rightarrow m(\angle B) = 99^\circ\ 35'\ 38.65''$

In Δ ADC

$\cos(D) = \frac{9^2 + 8^2 - 11^2}{2 \times 9 \times 8} = \frac{1}{6}$

$m(\angle D) = 80^\circ\ 24'\ 21.35''$

$m(\angle B) + m(\angle D) = 99^\circ\ 35'\ 38.65 + 80^\circ\ 24'\ 21.35 = 180$

$\therefore$ ABCD is asyclic quadrilateral

207 Find the Solution set of the following equation in $\mathbb{R}$: $4^{x} + 2^{x+1} = 8$ 48

Solution:

$$2^{2x} + 2^{x+1} - 8 = 0$$

$$2^{2x} + 2 \times 2^{x} - 8 = 0$$

$$(2^{x} - 2)(2^{x} + 4)$$

$2^{x} = 2^{1}$	$2^{x} = -4$
$x = 1$	Refused
$S.S = \{1\}$	

208 without using the calculator, prove that:

$$\log_6 8 + \log_6 27 = \log_3 27$$

Solution:

$$L.H.S = \log_6 8 \times 27 = \log_6 216 = \log_6 6^{3}$$

$$= 3\log_6 6 = 3 \quad \dots ①$$

$$R.H.S = \log_3 3^{3} = 3\log_3 3 = 3 \quad \dots ②$$

from 1, 2

$$R.H.S = L.H.S$$

209 Find

① $\lim_{x \to 1} \frac{x^2+5x-6}{x^2-1}$ (2) $\lim_{x \to 1} \frac{(x+1)^5-32}{x-1}$

Solution:

① $\lim_{x \to 1} \frac{(x-1)(x+6)}{(x-1)(x+1)} = \lim_{x \to 1} \frac{x+6}{x+1} = \frac{1+6}{1+1} = \frac{7}{2}$

② $\lim_{x+1 \to 2} \frac{(x+1)^5 - 2^5}{(x+1) - 2} = \frac{5}{1}(2)^{5-1} = 80$

210 ABC is a triangle in which $\cos A = \frac{2}{5}$, $b = 2\frac{1}{2}$ cm. and $c = 2$ cm. prove that the triangle is isosceles.

Solution

$a^2 = b^2 + c^2 - 2bc \cos A$

$= \frac{25}{4} + 4 - 2 \times \frac{5}{2} \times 2 \times \frac{2}{5} = \frac{25}{4}$

$\Rightarrow a = \frac{5}{2} = 2\frac{1}{2}$ cm

$\therefore a = b$

$\therefore$ the triangle is isosceles triangle

211

Find the Solution set of the inequality:

$|x| + 1 < 2$ in $\mathbb{R}$

Solution:

$|x| + 1 < 2$



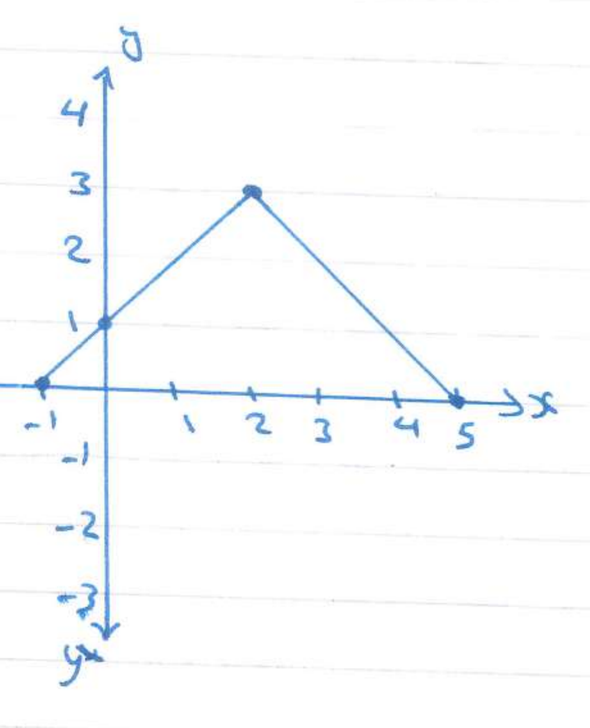
$|x| < 1$

$-1 < x < 1$ $\quad$ $S.S =]-1, 1[$

212 Graph the function f where $f(x) = \begin{cases} x+1, & -1 \leq x < 2 \\ 5-x, & 2 \leq x \leq 5 \end{cases}$

From the graph, deduce the range of this function, investigate it monotony and tell whether its even, odd or otherwise.

Solution:



Range $= [0, 3]$

the function is decreasing on $]2, 5[$,

increasing on $]-1, 2[$

the function is niether even nor odd

213 Find

51

(1) $\lim\limits_{x \to 1} \frac{x^3 - 2x + 1}{x^2 - 1}$ (2) $\lim\limits_{x \to 1} (\frac{1}{x} + 3)$

Solution:

① $\lim\limits_{x \to 1} \frac{(x-1)(x^2+x-1)}{(x-1)(x+1)} = \lim\limits_{x \to 1} \frac{x^2+x-1}{x+1} = \frac{1}{2}$

② $\lim\limits_{x \to 1} (\frac{1}{x} + 3) = \frac{1}{1} + 3 = 1 + 3 = 4$

214 ABC is atriangle in which $m(\angle B) = 35^\circ$, $m(\angle C) = 70^\circ$, and the radius length of the circumcircle of the Triangle = 16 Cm., find the area and perimeter of triangle ABC to the nearest integer.

Solution:

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$m(\angle A) = 180^\circ - (35 + 70) = 75^\circ$

from sine rule:

$$\frac{a}{\sin 75} = \frac{b}{\sin 35} = \frac{c}{\sin 70} = 32$$

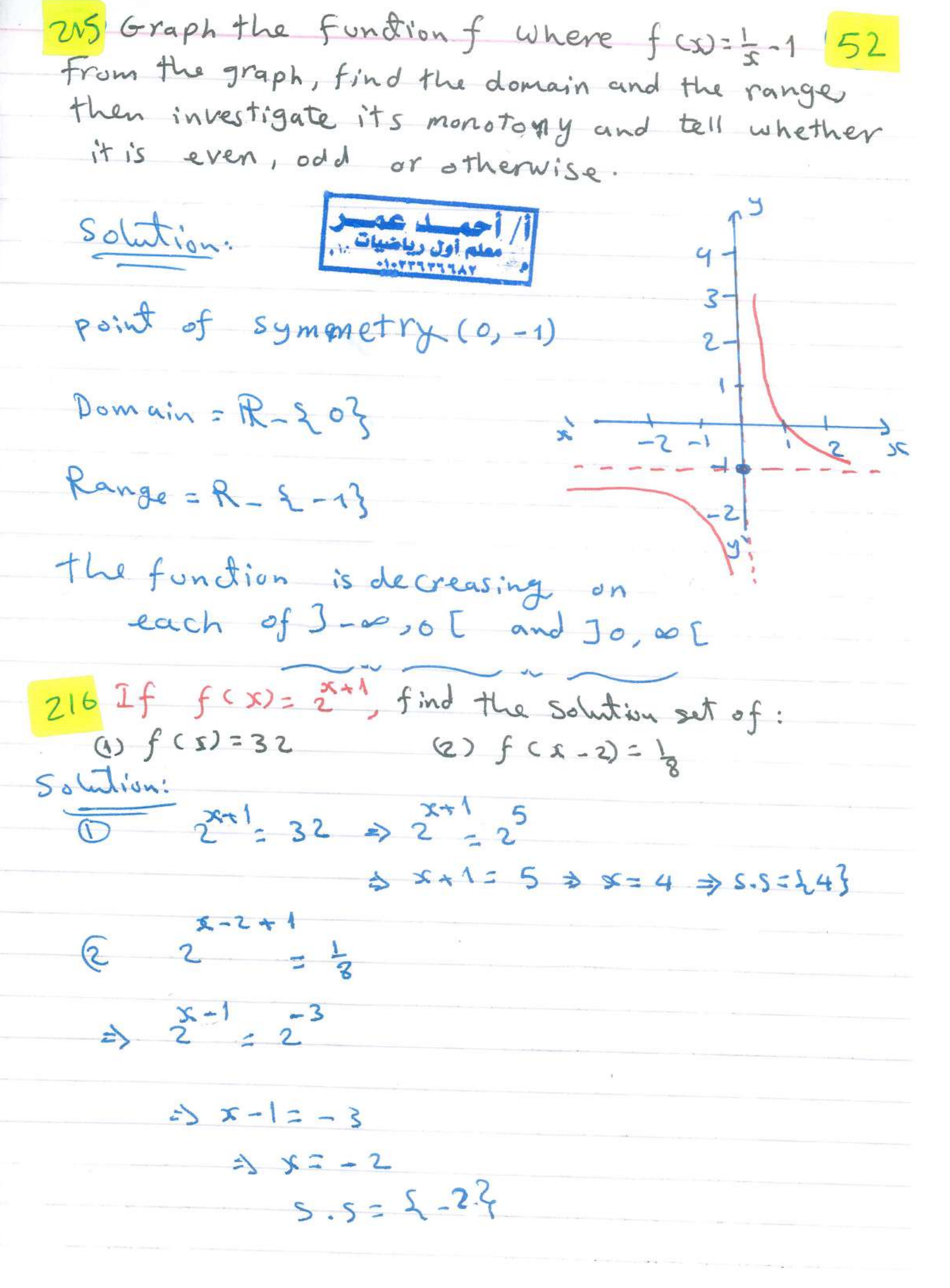
$a = 32 \sin 75^\circ \simeq 30.91$ cm

$b = 32 \sin 35^\circ \simeq 18.35$ cm

$c = 32 \sin 70 \simeq 30.1$ cm

Area of triangle ABC $= \frac{1}{2} \times 30.91 \times 18.35 \sin 70^\circ$
$\simeq 267$ cm²

the perimeter $= 30.91 + 18.35 + 30.1 \simeq 79$ cm



215 Graph the function f where $f(x) = \frac{1}{x} - 1$ 52

From the graph, find the domain and the range then investigate its monotony and tell whether it is even, odd or otherwise.

Solution:

point of symmetry (0, -1)

Domain $= \mathbb{R} - \{0\}$

Range $= \mathbb{R} - \{-1\}$

the function is decreasing on each of $]-\infty, 0[$ and $]0, \infty[$

216 If $f(x) = 2^{x+1}$, find the solution set of:

(1) $f(x) = 32$ (2) $f(x-2) = \frac{1}{8}$

Solution:

① $2^{x+1} = 32 \Rightarrow 2^{x+1} = 2^5$

$\Rightarrow x + 1 = 5 \Rightarrow x = 4 \Rightarrow S.S = \{4\}$

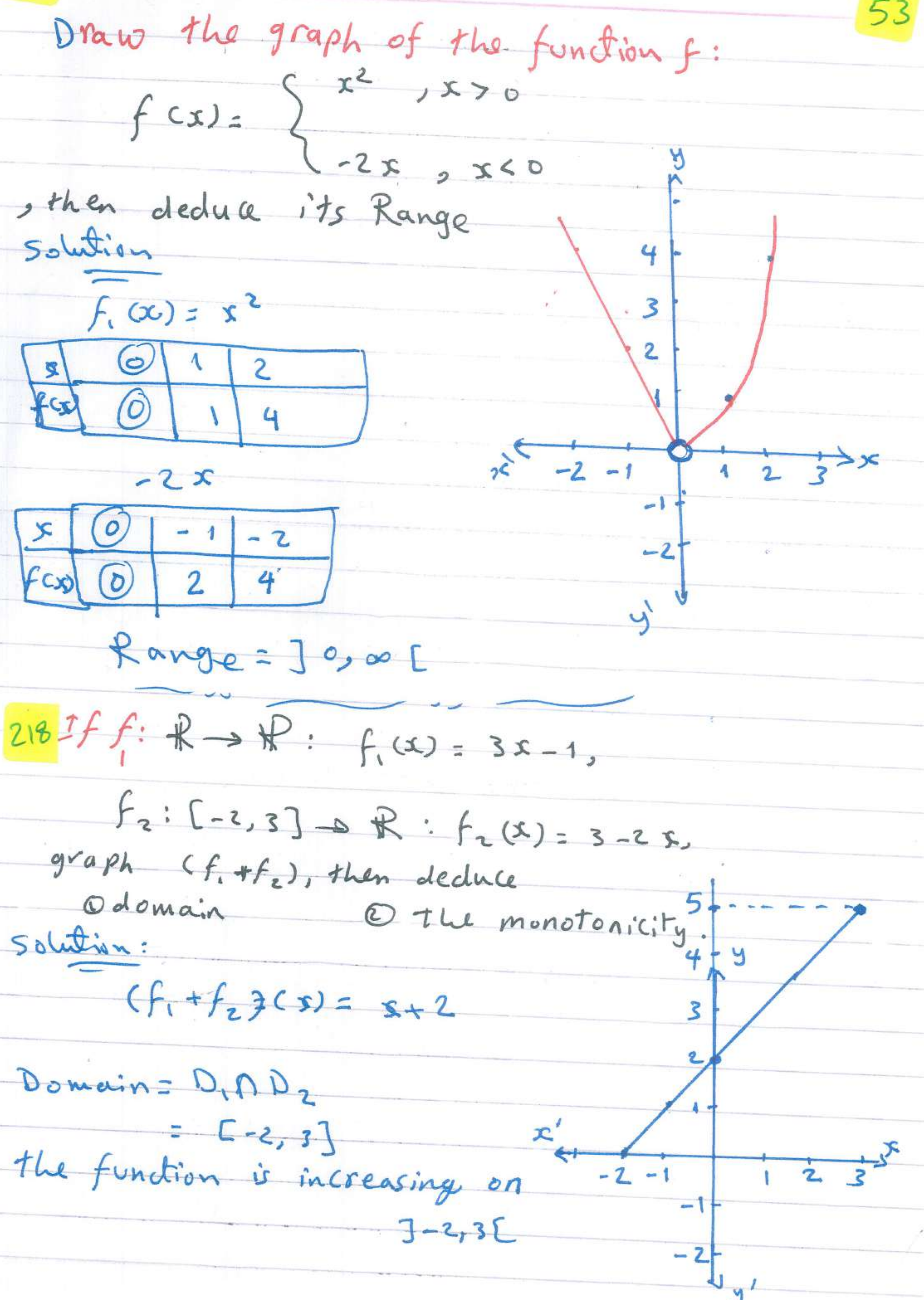
② $2^{x-2+1} = \frac{1}{8}$

$\Rightarrow 2^{x-1} = 2^{-3}$

$\Rightarrow x - 1 = -3$

$\Rightarrow x = -2$

$S.S = \{-2\}$



217 Draw the graph of the function f:

$$f(x) = \begin{cases} x^2 & , x > 0 \\ -2x & , x < 0 \end{cases}$$

, then deduce its Range

Solution

$f_1(x) = x^2$

x	(0)	1	2
$f(x)$	(0)	1	4

$-2x$

x	(0)	-1	-2
$f(x)$	(0)	2	4

Range $=]0, \infty[$

218 If $f_1 : \mathbb{R} \to \mathbb{R} : f_1(x) = 3x - 1$,

$f_2 : [-2, 3] \to \mathbb{R} : f_2(x) = 3 - 2x$,

graph $(f_1 + f_2)$, then deduce

① domain ② the monotonicity.

Solution:

$(f_1 + f_2)(x) = x + 2$

Domain $= D_1 \cap D_2$

$= [-2, 3]$

the function is increasing on

$]-2, 3[$

219

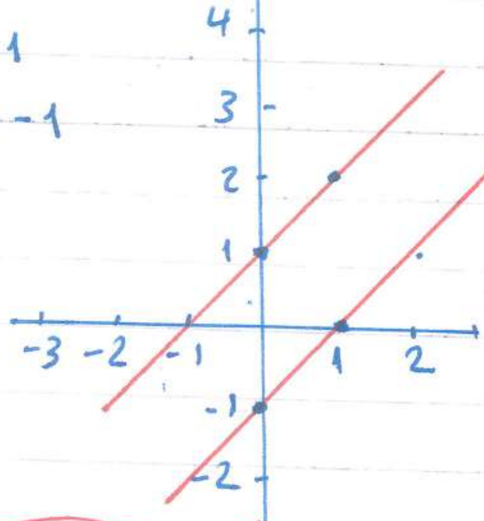
Find the inverse function of the function f: $f(x) = x + 1$, then graph $f(x)$, $f^{-1}(x)$

Solution:

$\because y = x + 1 \quad \therefore x = y + 1$

$\Rightarrow y = x - 1$

$\therefore f^{-1}(x) = x - 1$



220 Solve in $\mathbb{R}$ the following two functions:

① $\log_4 x = 1 - \log_4 (x - 3)$ ② $|x + 2| = |x - 3|$

Solution

1[1] $\log_4 x + \log_4 (x - 3) = 1$

$\Rightarrow \log_4 x(x - 3) = 1$

$\Rightarrow x(x - 3) = 4 \Rightarrow x^2 - 3x - 4 = 0 \Rightarrow (x+1)(x-4) = 0$

$\Rightarrow x = -1$ refused or $x = 4$

$S.S = \{4\}$

1[2] $| x + 2 = \pm (x - 3)$

$x + 2 = x - 3$

$2 \neq -3$

|

$x + 2 = -x + 3$

$2x = 1$

$x = \frac{1}{2}$

$S.S = \{\frac{1}{2}\}$

221 Find $\lim_{x \to 2} \frac{x^5 - 32}{x^2 + 3x - 10}$ (b) $\lim_{x \to 0} \frac{\sin 2x + 5 \sin 3x}{x}$

Solution:

(a) $\lim_{x \to 2} \frac{x^5 - 2^5}{(x-2)(x+5)} = \lim_{x \to 2} \frac{x^5 - 2^5}{x^1 - 2^1} \cdot \lim_{x \to 2} \frac{1}{x+5}$

$= \frac{5}{1}(2)^{5-1} \times \frac{1}{2+5} = \frac{80}{7}$

(b) $\lim_{x \to 0} \left(\frac{\sin 2x}{x} + \frac{5 \sin 3x}{x} \right) = 2 + 5 \times 3 = 17$

222 Solve the acute-angled triangle ABC in which $a = 21$ cm., $b = 25$ cm. and the length of the diameter of the circumcircle of the triangle ABC equals 28 cm.

Solution:

$a = 21$, $b = 25$ cm , $r = \frac{28}{2} = 14$ cm

from sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2r$

$\Rightarrow \frac{21}{\sin A} = \frac{25}{\sin B} = \frac{28}{1}$

$\Rightarrow \sin A = \frac{21}{28} \Rightarrow m(\angle A) = 48^\circ\ 35'\ 25.36''$

and $\sin B = \frac{25}{28} \Rightarrow m(\angle B) = 63^\circ\ 14'\ 4.20''$

$\Rightarrow m(\angle C) = 180 - (48^\circ\ 35'\ 25.36'' + 63^\circ\ 14'\ 4.20'')$

$= 68^\circ\ 10'\ 30.44''$

$$\Rightarrow \frac{C}{\sin 68^\circ 10' 30.44''} = 28 \text{ cm}$$

$$\Rightarrow C \simeq 26 \text{ cm}$$

223 From the opposite graph, find:

(1) $\lim_{x \to 1} f(x)$

(2) $\lim_{x \to 2} f(x)$

(3) $f(1)$

Solution: $f(x) = \begin{cases} x-1 , & x \geq 1 \\ -x+1 , & x < 1 \end{cases}$

(1) $\lim_{x \to 1} f(x)$

$\lim_{x \to 1^-} -x+1 = 0$, $\lim_{x \to 1^+} x-1 = 0$

$\Rightarrow \lim_{x \to 1} f(x) = 0$

(2) $\lim_{x \to 2} f(x) = \lim_{x \to 2} (x-1) = 2-1 = 1$

(3) $f(1) = 0$

224 ABCD is a parallelogram in which $m(\angle A) = 50^\circ$, $m(\angle DBC) = 70^\circ$, $BD = 8$ cm. Find the perimeter of the parallelogram.

$m(\angle C) = m(\angle A) = 50^\circ$

, $m(\angle CDB) = 180 - (50 + 70) = 60$

In triangle DBC

$$\frac{8}{\sin 50} = \frac{BC}{\sin 60} = \frac{DC}{\sin 70}$$

$$\Rightarrow BC = \frac{8 \sin 60}{\sin 50} \simeq 9 \text{ cm}$$



$$, \ DC = \frac{8 \sin 70^\circ}{\sin 50^\circ} \simeq 9.8 \text{ cm}$$

, Then the perimeter of the parallelogram =

$$(DC + BC) \times 2 = (9 + 9.8) \times 2 \simeq 37.6 \text{ cm}$$

225 ABC is a triangle in which $a = 5$ cm, $b = 7$ cm, $m(\angle A) = 40^\circ$

Find: $m(\angle B)$.

Solution:

$a = 5$ cm, $b = 7$ cm, $m(\angle A) = 40$

From the sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$$\frac{5}{\sin 40} = \frac{7}{\sin B}$$

$$\sin B = \frac{7 \sin 40^\circ}{5} \simeq 0.8999$$

$$\Rightarrow m(\angle B) = 64^\circ \ 8' \ 42.99''$$

226

Use the curve of the function $f: f(x) = x^2$ to represent each of:

① $f_1(x) = f(x+2)$ ② $f_2(x) = x^2 + 2$

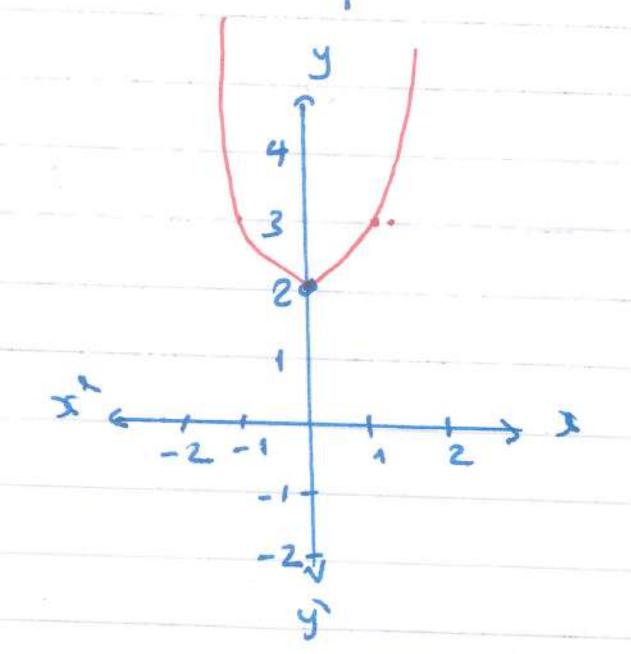
Solution:

$f_1(x) = (x+2)^2$

the point of symmetry is $(-2, 0)$

$f_2(x) = x^2 + 2$

the point of symmetry is $(0, 2)$



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227 Find in $\mathbb{R}$ the solution set of the inequality:

$$|3x - 2| \geq 7$$

Solution:

$x \geq \frac{2}{3}$	$x < \frac{2}{3}$
$3x - 2 \geq 7$	$3x - 2 \leq -7$
$3x \geq 9 \quad \div 3$	$3x \leq -5 \quad \div 3$
$x \geq 3$	$x \leq -\frac{5}{3}$

$$S.S = \mathbb{R} -]-\tfrac{5}{3}, 3[$$

228 Find the value of a which makes the function f continuous at $x = 2$

where $f(x) = \begin{cases} x^2 - 1 , & x \geq 2 \\ x - 2a , & x < 2 \end{cases}$

Solution:

Since f is continuous at $x = 2$

$\Rightarrow \quad f(2^-) = f(2^+)$

$(2)^2 - 1 = 2 - 2a$

$\Rightarrow \quad 3 = 2 - 2a \Rightarrow 2a = -1 \Rightarrow \boxed{a = -\frac{1}{2}}$

229 Discuss the existence of $\lim\limits_{x \to 0} f(x)$ where

$$f(x) = \begin{cases} \dfrac{\tan 2x}{\sin x} , & x > 0 \\[2ex] \dfrac{5x + 6}{x + 3} , & x < 0 \end{cases}$$

$$f(0^-) = \lim_{x \to 0^-} \frac{5x + 6}{x + 3} = \frac{6}{3} = 2 \quad \ldots (1)$$

$$f(0^+) = \lim_{x \to 0^+} \frac{\frac{\tan 2x}{x}}{\frac{\sin x}{x}} = \frac{\frac{2}{1}}{1} = 2 \quad \ldots (2)$$

from 1, 2 $\quad \lim\limits_{x \to 0} f(x) = 2$

230 Find in $\mathbb{R}$ the solution set of the equation:

$$x^{4/3} - 10x^{2/3} + 9 = 0$$

Solution:

$$(x^{2/3} - 1)(x^{2/3} - 9) = 0$$

$x^{2/3} = 1$ | $x^{2/3} = 9$

$x = 1^{3/2} = 1$ | $x = 9^{3/2}$

$x = \pm 27$

$$S.S = \{1, 27, -27\}$$

231 If: $f(x) = a^x$, prove that:

$$\frac{1}{f(x)+1} + \frac{1}{f(-x)+1}$$ has a costant value

whatever the value of x

Solution:

$$\frac{1}{f(x)+1} + \frac{1}{f(-x)+1} = \frac{1}{a^x+1} + \frac{1}{a^{-x}+1}$$

$$= \frac{a^{-x}+1+a^x+1}{(a^x+1)(a^{-x}+1)} = \frac{a^x+a^{-x}+2}{1+a^x+a^{-x}+1}$$

$$= \frac{a^x+a^{-x}+2}{a^x+a^{-x}+2} = 1 = \text{Constant}$$

232

Find: $\lim_{x \to 1} \frac{4 - \sqrt{x+15}}{1 - x^2}$

Solution:

$$L = \lim_{x \to 1} \frac{4 - \sqrt{x+15}}{1 - x^2} = \lim_{x \to 1} \frac{4 - \sqrt{x+15}}{1 - x^2} \times \frac{4 + \sqrt{x+15}}{4 + \sqrt{x+15}}$$

$$= \lim_{x \to 1} \frac{16 - (x+15)}{(1 - x^2)(4 + \sqrt{x+15})}$$

$$= \lim_{x \to 1} \frac{(1 - x)}{(1 - x)(1 + x)(4 + \sqrt{x+15})}$$

$$\Rightarrow \lim_{x \to 1} \frac{1}{(1+x)(4 + \sqrt{x+15})} = \frac{1}{(2)(8)} = \frac{1}{16}$$

233 If the function f where

$$f(x) = \begin{cases} \frac{x^2 + 2x - 3}{x+3} & , x \neq -3 \\ x + a & , x = -3 \end{cases}$$

is continuous at $x = -3$, find the value of a

Solution:

$$\lim_{x \to -3} \frac{x^2 + 2x - 3}{x+3} = \lim_{x \to -3} \frac{(x-1)(x+3)}{x+3} = \lim_{x \to -3} (x-1) = -4$$

Since the function is continuous $\therefore f(-3) = \lim_{x \to -3} f(x)$

$\Rightarrow -3 + a = -4 \Rightarrow \boxed{a = -1}$

234 put in the simplest form:

$$\log_b a^2 \times \log_c b^3 \times \log_a c$$

Solution:

the expression $= \frac{\log a^2}{\log b} \times \frac{\log b^3}{\log c} \times \frac{\log c}{\log a}$

$= \frac{2 \log a}{\log b} \times \frac{3 \log b}{\log c} \times \frac{\log c}{\log a}$

$= 2 \times 3 = 6$

235 Use the curve of the function $f(x) = |x|$ to represent each of the following

① $f_1(x) = |x| + 1$ ② $f_2(x) = 2 - |x|$

Solution:

$f_1(x) = |x| + 1$

point of symmetry $(0, 1)$

y, x', x, y', 3, 2, 1, -1, 1, -1, -2

$f_2(x) = 2 - |x|$

point of symmetry $(0, 2)$

y, 2, 1, x', x, -2, -1, 1, 2, -1, -2, y'

236 ABC is a triangle in which:

$\frac{1}{3}\sin A = \frac{1}{4}\sin B = \frac{1}{5}\sin C$, find : $m(\angle C)$

, and if the perimeter of the triangle = 24 cm. find its surface area.

Solution:

$$\frac{\sin A}{3} = \frac{\sin B}{4} = \frac{\sin C}{5}$$

$\Rightarrow a = 3K, \quad b = 4K, \quad c = 5K$

from the cosine rule:



$$\cos C = \frac{a^2 + b^2 - c^2}{2ab} = \frac{9K^2 + 16K^2 - 25K^2}{2 \times 3K \times 4K}$$

$$= \frac{0}{24K^2} = 0$$

$\Rightarrow m(\angle C) = 90°$

$\because$ the perimeter $= 24$

$\Rightarrow 3K + 4K + 5K = 24$

$\Rightarrow 12K = 24 \quad \Rightarrow K = 2$

$\Rightarrow a = 6$ cm, $b = 8$ cm, $c = 10$ cm

$\therefore$ The area $= \frac{1}{2} ab \sin C = \frac{1}{2} \times 6 \times 8 \times \sin 90$

$= 24$ cm^2

237) If $\lim\limits_{x \to 2} \dfrac{x^2 - 4a}{x - 2}$ exists, then $a = \dots$

(a) -1 (b) 1 (c) 2 (d) 4

238 $\lim\limits_{x \to \infty} (4 + 3x - x^3) = \dots$

(a) 4 (b) 2 (c) ∞ (d) $-\infty$

239 If $a < b <$ zero, then $\lim\limits_{x \to \infty} \dfrac{x^a}{x^b} = \dots$

(a) ∞ (b) $-\infty$ (c) zero (d) $a - b$

240 Discuss the continuity of the function f,

where $f(x) = \begin{cases} x^2 + 3 & , x \geq 1 \\ \dfrac{x^2 + 2x - 3}{x - 1} & , x < 1 \end{cases}$

241) Investigate the existence of $\lim\limits_{x \to 3} f(x)$

given that $f(x) = \begin{cases} \dfrac{x^2 - 7x + 12}{x - 3} & , x > 3 \\ 2x - 7 & , x < 3 \end{cases}$

242 The opposite figure represents the curve of the function f, then find

$\lim\limits_{x \to 2} |f(x)|$

243 If $f(x) = 3x+1$, $g(x) = x^2-5$, then
$(g \circ f)(-3) = \dots$
(a) -5 (b) 5 (c) 59 (d) -95

244 If f is an odd function on $[-x, x]$,
then $f(-x) + f(x) = \dots$
(a) $2x$ (b) undefined (c) $-2x$ (d) zero

245 The range of the function $f: f(x) = \frac{x-2}{2-x}$
equals ...
(a) $\mathbb{R}$ (b) $\mathbb{R}-\{2\}$ (c) $\mathbb{R}-\{-2\}$ (d) $\{-1\}$

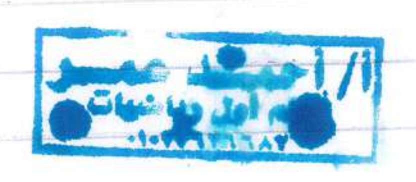
246 Graph the function $f: f(x) = \begin{cases} |x|, & x \leq 0 \\ x^2, & x > 0 \end{cases}$

from the graph state the range of the function and discuss its monotony, and its type whether it is odd, even or otherwise

247 If $f_1(x) = x^5$, $f_2(x) = \sin x$, find (f_1+f_2)
hence find the type of (f_1+f_2) whether it is even, odd or otherwise

248 find the domain of the function

$f: f(x) = \frac{2x+1}{x-2}$ and prove that f is one-to-one.



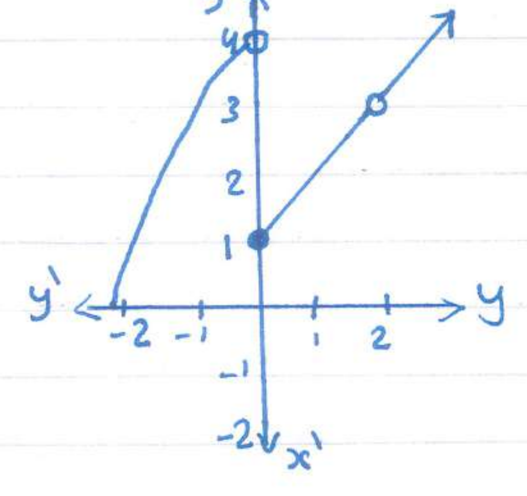
249 Find

(1) $\lim_{x \to 0} \frac{x^2 + \sin 3x^2}{x \tan 2x}$ (2) $\lim_{x \to} \frac{\sqrt{x+4} - 2}{x^2 + x}$

250 In the opposite figure, find:

(1) $f(\text{zero}^+)$ (2) $f(\text{zero}^-)$

(3) $f(2)$ (4) $\lim_{x \to 2} f(x)$



251 Find:

(1) $\lim_{x \to \infty} \frac{1}{x} \sqrt{3 + 4x^2}$

(2) $\lim_{x \to \infty} x \left(\sqrt{4x^2 + 1} - 2x \right)$

(3) $\lim_{x \to \infty} \frac{x^7 + 5}{3x^4 - 8}$

(4) $\lim_{x \to 4} \frac{(x-3)^7 - 1}{x - 4}$

(5) $\lim_{x \to 0} \frac{x^2 + \sin 3x^2}{x \tan 2x}$



(6) $\lim_{x \to 0} \frac{5 - 5\cos x}{x}$

252 If $f(x) = \frac{1}{x}$, $g(x) = x + 3$, find:

(1) $(f \circ g)(x)$ (2) $(g \circ f)(x)$

and state the domain in each case.

253 Find in $\mathbb{R}$ the solution set of each of the following:

(1) $\sqrt{x^2 - 6x + 9} + 2x = 9$

(2) $\frac{1}{|2x - 3|} > 2$

254 Graph the function $f : f(x) = \sqrt{x^2 - 4x + 4}$ and determine its range and discuss its monotony.

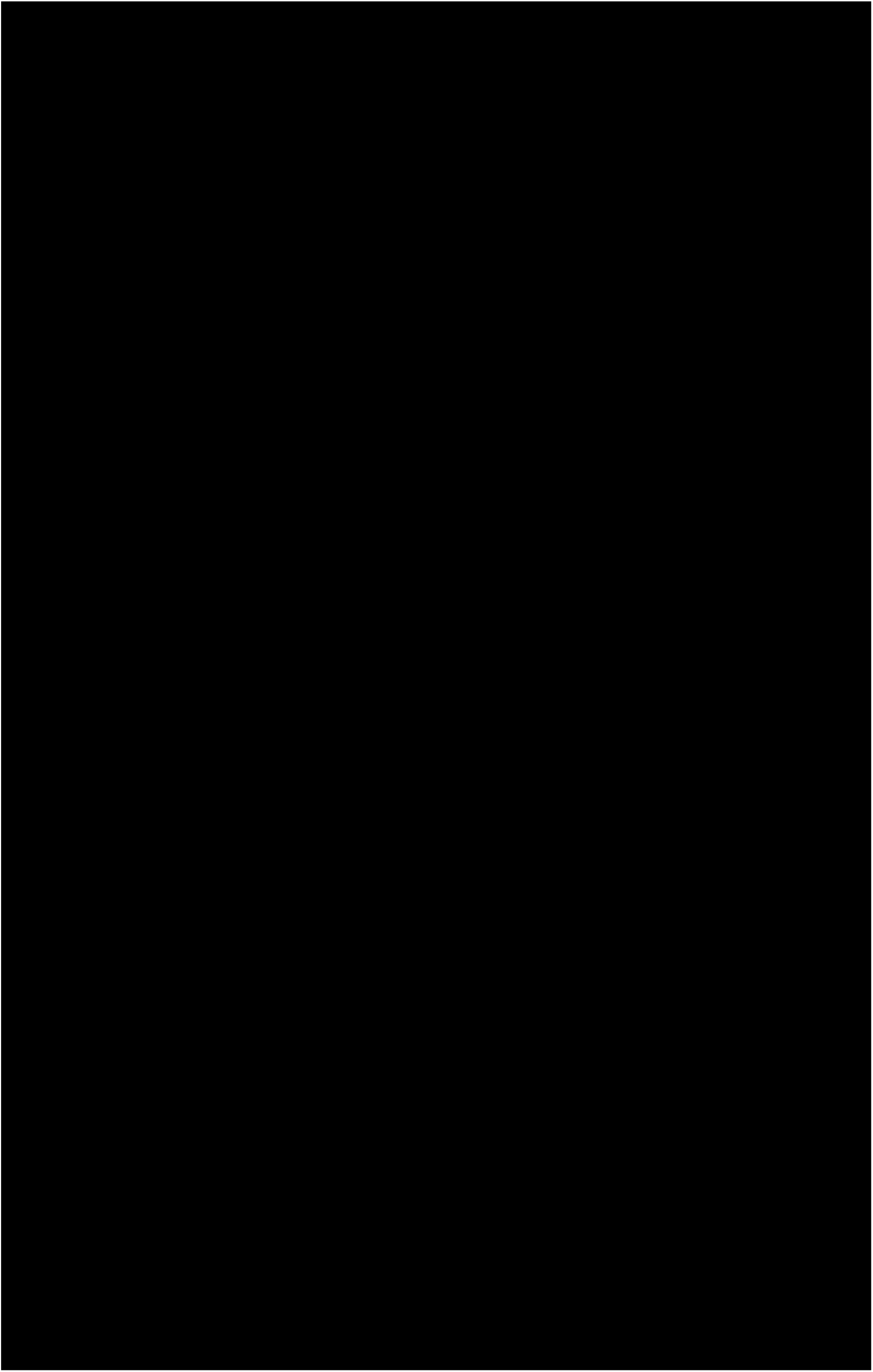
255 Find algebraically the solution set of the equation

$$|x - 3| = |9 - 2x|$$

256 find the solution set of the inequality: $\sqrt{4x^2 - 12x + 9} \leq 9$ in $\mathbb{R}$

with my best wishes

Mr/ Ahmed omar







كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9

File Edit View E-Sign Window Help

- Open... Ctrl+O
- Reopen PDFs from last session
- Create
- Insert Pages
- Save Ctrl+S
- Save As... Shift+Ctrl+S
- Save as Other
- Reduce File Size
- Export To
- Protect Using Password
- Request Signatures
- Share File
- Revert
- Close File Ctrl+W
- Properties... Ctrl+D
- Print... Ctrl+P
- 1 0003.pdf
- 2 E:\Image\pdf\0001.pdf
- 3 0001.pdf
- 4 Adobe Scan 2 Sep 2021.pdf
- 5 E:\Image\New folder\2.pdf
- View All Recent Files...
- Exit Application Ctrl+Q

خطوة 1

خطوة 2
اختيار اسم الطابعة بتاعتك

خطوة 3
كتابة الصفحات المراد طباعتها
نكتب رقم 4 ثم نكتب الشرطة دي – ثم نكتب 9

خطوة 4
اختيار نوع الورق

Print
Printer: HP LaserJet M207-M212 | Properties | Advanced | Help
Copies: 1 | Print in grayscale (black and white) | Save ink/toner
Pages to Print: All | Current | Pages 4 - 9
More Options
Page Sizing & Handling: Size | Poster | Multiple | Booklet
Fit | Actual size | Shrink oversized pages | Custom Scale: 100 % | Choose paper source by PDF page size
Orientation: Auto | Portrait | Landscape
Comments & Forms: Document and Markups | Summarize Comments
Document: 21.0 x 29.7cm
21.59 x 27.94 cm
Page 1 of 18
Page Setup... | Print | Cancel

خطوة 5
اختيار A4

Page Setup
Paper
Size: A4
Source: Automatically Select
Orientation: Portrait | Landscape
Margins (millimeters): Left 25 | Right 25 | Top 25 | Bottom 25
OK | Cancel

خطوة 6

Print

امتحانات رقم (1)









Model Exam of Second year secondary First Term 2023- 2024

General Mathematics **Time: 3 hours**

نموذج استرشادى رياضيات العامة للصف الثانى الثانوى أدبي للعام الدراسى ٢٠٢٣ / ٢٠٢٤م

First: Choose the correct answer

1) The domain of the function f : $f(x) = \frac{2x}{1-x^2}$ is ....

A	$\{1 , -1\}$	B	$R - \{1\}$	C	$R - \{1 , -1\}$	D	$\{2 , 0 , -1 , 1\}$

2) $\lim_{x \to 3} \left(\frac{x^2 - 3}{x - 1}\right) =$ ....

A	3	B	6	C	0	D	$\frac{1}{3}$

3) ABC is a triangle in which m (∠ A) = 30°, m (∠ C) = 60°, if $c = 15\sqrt{3}$ cm : then a = ... cm

A	60	B	45	C	30	D	15

4) The curve of the function f : $f(x) = 2^{x+1}$ intersects Y-axis at the point ....

A	(1 , 4)	B	(0 , 2)	C	(0 , 4)	D	(1 , 0)

5) Which of the following functions represents an even function ?

A	f (x) = 2 x + 5	B	g (x) = x sin x	C	$h(x) = 2x^2 - x$	D	n (x) = x cos x

6) 1) The measure of the greatest angle in the triangle whose sides length are: 3 cm , 5 cm and 7 cm is .... °

A	150	B	110	C	120	D	100

7) $\lim_{x \to 4} \left(\frac{4x - 16}{x^2 - 16}\right) =$ ....

A	$\frac{1}{4}$	B	$\frac{1}{2}$	C	2	D	4

8) $\lim_{x \to -1} \left(\frac{4x + 4}{x + 1}\right) =$ ....

A	− 1	B	1	C	2	D	4

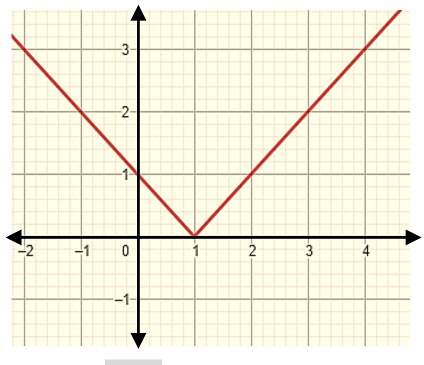
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مكتب مستشار الرياضيات



9) *In the opoosite figure* :

The range of the function f :

f (x) = | $x - 1$ | is ....



A]– ∞ , 1] B [1 , ∞ [C [0 , ∞ [D [0 , ∞]

10) The solution set of the equation : $\log_2 x = 4$ in R is ....

A { 8 } B { 2 } C { 16 } D { 4 }

11) The solution set of the inequality | $x - 2$ | < 6 in R is ....

A]– 4 , 8[B [– 4 , 6[C [2 , – 1[D [– 4 , 8]

12) In Δ ABC , if m (∠ C) = 60 °, we get $a^2 + b^2 - c^2 = k\,a\,b$, then k = ...

A $\frac{1}{2}$ B 2 C 1 D – 1

13) $\lim\limits_{x \to 2} \left(\frac{x^5 - 32}{x^3 - 8} \right)$ = ...

A $\frac{20}{3}$ B $\frac{5}{3}$ C 4 D 2

14) If $\lim\limits_{x \to 2} \left(\frac{3x - a}{x + 1} \right) = 1$, then a = ...

A 0 B 3 C 6 D 9

15) The solution set for the equation: | $3 - x$ | – 5 = 3 in R is ....

A {5 , – 11} B {– 5 , 11} C {8 , 5} D {11 , 8}

16) ABC is a triangle : if a = 7 cm , b = 9 cm , m (∠ C) = 30 °,
then its area = ... cm ^{2}

A $\frac{63}{2}$ B $\frac{63}{4}$ C 63 D $\frac{63}{6}$

عاشور لطفي النجار

17) The axis of symmtery of the curve of the function f : $f(x) = (x-1)^2 + 3$ is ……

A	$x = 1$	B	$x = -1$	C	$x = 3$	D	$x = -3$

18) In Δ ABC if a : sin A = 14 : 1 , then the circumference of the circumcircle of Δ ABC = ……….. unit length

A	14π	B	7π	C	28π	D	49π

19) $\lim_{x\to\infty} \left(\frac{1-7x+2x^2}{3x^2+1}\right) =$ ………..

A	$\frac{4}{3}$	B	$-\frac{7}{3}$	C	$\frac{2}{3}$	D	$\frac{7}{3}$

20) If f : $f(x) = 3^x$, then the value of x which satisfies the equation $f(x-1) = 81$ is ……….

A	4	B	5	C	6	D	9

21) $\lim_{x\to 0} \left(\frac{(2-3x)^7 - 128}{16x}\right) =$ ………..

A	16	B	– 32	C	– 41	D	– 84

22) Domain of the function f : $f(x) = \log_3 (x-1)$ is ………..

A	] – ∞ , 1 [	B	] 0 , 1 [	C	] 1 , ∞ [	D	[0 , ∞ [

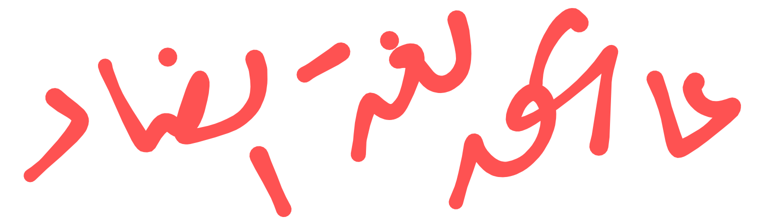
23) $\lim_{x\to\infty} (7)^{\frac{1}{x}} =$ ………..

A	7	B	1	C	$\frac{1}{7}$	D	0

24) The point of symmetry of the curve of the function f : $f(x) = \frac{1}{x-1} + 2$ is ………

A	(1 , 2)	B	(2 , 1)	C	(– 1 , 2)	D	(1 , – 2)

رضا نجار



25) $\frac{\log(3)^x}{\log(9)^x} = \dots\dots\dots\dots$

A $\frac{1}{3}$ B $\frac{x}{3}$ C 2 D $\frac{1}{2}$

26) ABC is a triangle: if b = 4 cm , c = 5 cm , cos A = $\frac{2}{5}$, then a = ………… cm

A 5 B 6 C 4 D 8

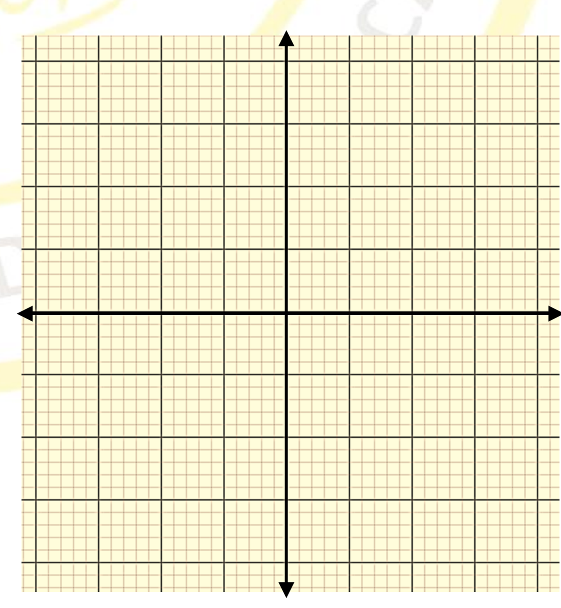
27) If $3^{x+1} = 17$, then x = ………… (to the nearest one decimal number)

A 2.6 B 3.6 C 1.8 D 1.6

Second: Answer the following qestions:

1) Find : $\lim_{x \to 3} \left(\frac{2x^2 - 5x - 3}{x^2 - 9} \right)$

2) Draw the curve of the function f : f $(x) = 2 - (x + 1)^2$, and from the graph find its range and discuss its monotony.





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الإدارة المركزية لتطوير المناهج
مكتب مستشار الرياضيات

Model Answers of Second year secondary First Term 2023- 2024
General Mathematics (Arts section)

نموذج إجابة اختبار استرشادي نهاية الفصل الدراسي الأول الصف الثاني الثانوي (ادبى)

المادة: رياضيات عامة **2023 / 2024**م

First: Choose the correct answer

27 × 1 = 27 Marks

Question number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Anwser	C	A	D	B	B	C	B	D	C	C	A	C	A	B
Question number	15	16	17	18	19	20	21	22	23	24	25	26	27	
Anwser	B	B	A	A	C	B	D	C	B	A	D	A	D	

Second: Answer the following qestions:

2 Marks

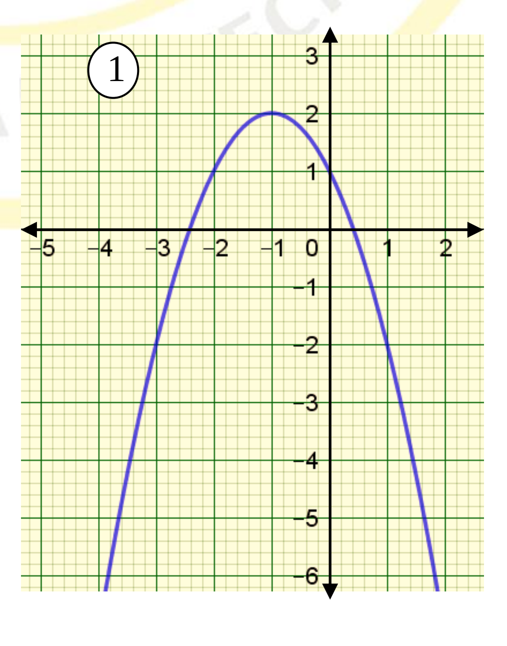
1) $\lim_{x \to 3} \left(\frac{2x^2 - 5x - 3}{x^2 - 9} \right) = \lim_{x \to 3} \left(\frac{(2x+1)(x-3)}{(x+3)(x-3)} \right)$ (1)

$= \lim_{x \to 3} \left(\frac{(2x+1)}{(x+3)} \right)$ $\left(\frac{1}{2}\right)$ $= \frac{7}{6}$ $\left(\frac{1}{2}\right)$

3 Marks

2)

- The range $=]-\infty, 2]$ (1)
- Increasing when $x \in]-\infty, -1[$ $\left(\frac{1}{2}\right)$
- Decreasing when $x \in]-1, -\infty[$ $\left(\frac{1}{2}\right)$



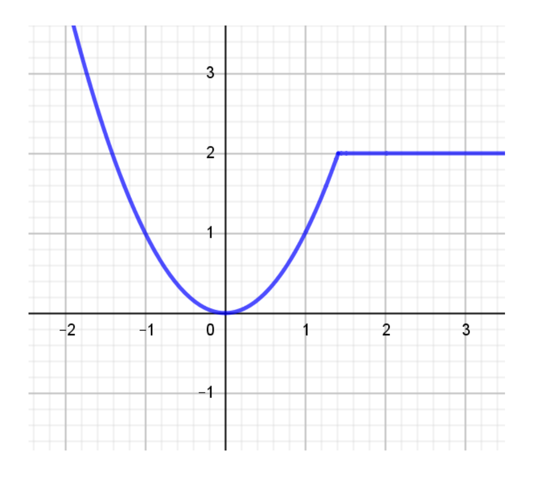


أسئلة استرشادية للصف الثانى الثانوى

رياضيات(١) للقسم الأدبى باللغة الإنجليزية

1-The opposite figure represents the graph of a function

The range of the function is ……….



a) [0 , ∞ [

b) [0 , 2 [

c)] - ∞ , ∞ [

d)] - ∞ , 2 [

2- Which of the following relations represents a function?

a) $x + y^2 = 3$

b) $x^2 + y = 8$

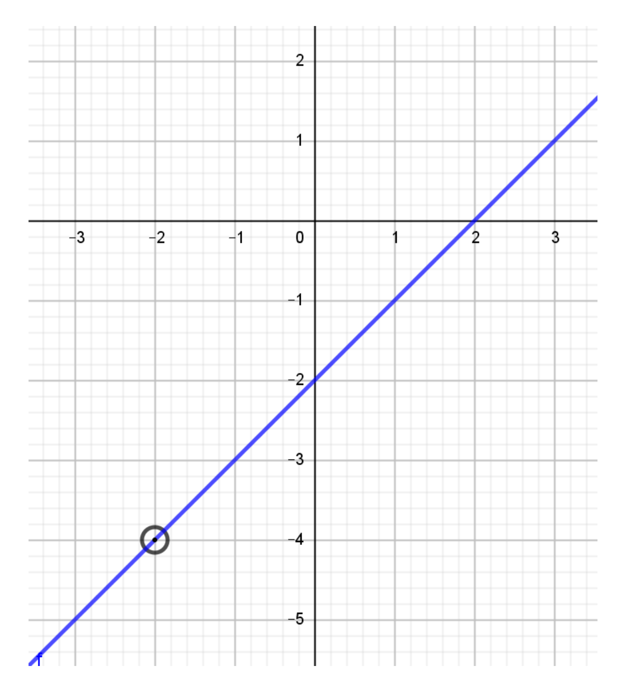
c) $x^2 + y^2 = 25$

d) $x = 5$

3- The opposite graph represents the function

$f(x) = \frac{x^2 - 4}{x+2}$

$\lim_{x \to -2} f(x)$ ....





a) Undefined
b) = 4
c) = - 4
d) = 2

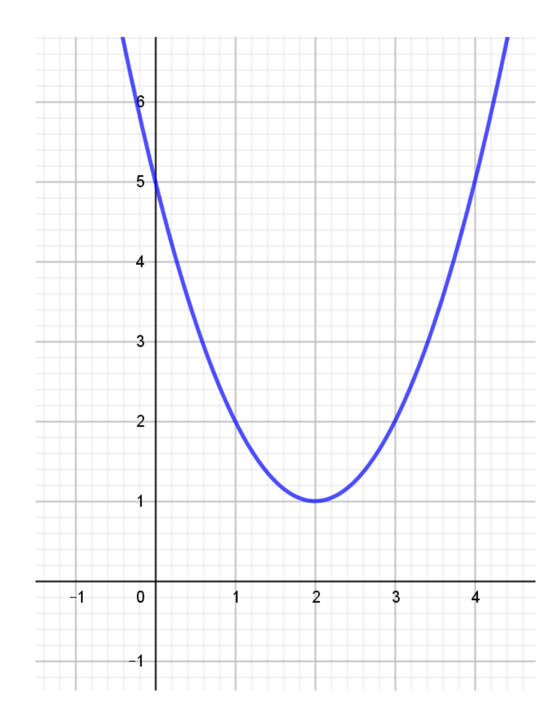
4- In the triangle ABC the expression $\frac{b^2 + c^2 - a^2}{bc}$ = ...

a) cos a
b) 2cos a
c) sin a
d) 2sin a

5- Find the solution set of $|x - 5|$+5 = x.

6- In the opposite figure

$\lim_{x \to 2} f(x)$ ....



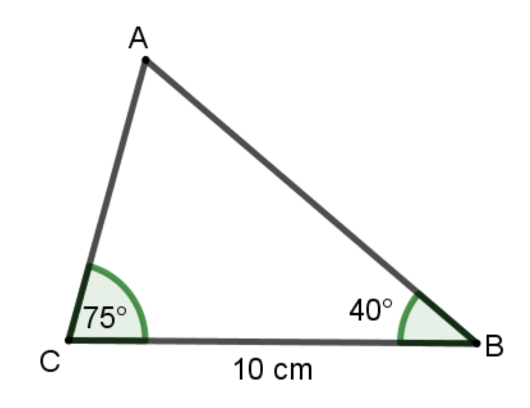
a) = 2
b) =5
c) =1
d) Not exist

7- If F: $R^+ \to R$, f(x) = x – 5 and n : [-1 , 5] $\to$ R , n(x) = x - 2,

Then find the domain of the function (f + n)(x).

8- In the opposite figure:

c = …………. cm



a) 7
b) 10
c) 11
d) 8

9- Find $\lim_{x \to \infty} \frac{\sqrt{x^3 + 5x + 7}}{x^2 + 4}$

10-In the triangle ABC,

If a = 7cm , m($\hat{B}$) =30° , m($\hat{C}$) =105°

Then b = ……….. cm

a) $\frac{7}{2}$
b) $\frac{7\sqrt{2}}{2}$
c) 7
d) $7\sqrt{2}$

11- The solution set of the inequality:

$|x| + 2 <$ zero   in R is…….

a) {-2}
b) {2}
c) ϕ
d)] -2 , 2 [

12- $\lim_{x \to 3} \frac{3x^4 - 243}{x - 3} = \cdots$

a) 81
b) 324
c) 4
d) 576



كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9



خطوة 1

خطوة 2 اختيار اسم الطابعة بتاعتك

خطوة 3 كتابة الصفحات المراد طباعتها نكتب رقم 4 ثم نكتب الشرطة دي – ثم نكتب 9

خطوة 4 اختيار نوع الورق

خطوة 5 اختيار A4

خطوة 6

File Edit View E-Sign Window Help

Open... Ctrl+O
Reopen PDFs from last session
Create
Insert Pages
Save Ctrl+S
Save As... Shift+Ctrl+S
Save as Other
Reduce File Size
Export To
Protect Using Password
Request Signatures
Share File
Revert
Close File Ctrl+W
Properties... Ctrl+D
Print... Ctrl+P
1 0003.pdf
2 E:\Image\pdf\0001.pdf
3 0001.pdf
4 Adobe Scan 2 Sep 2021.pdf
5 E:\Image\New folder\2.pdf
View All Recent Files...
Exit Application Ctrl+Q

Print

Printer: HP LaserJet M207-M212 — Properties — Advanced — Help

Copies: 1 — Print in grayscale (black and white) — Save ink/toner

Pages to Print: All — Current — Pages 4 - 9 — More Options

Page Sizing & Handling: Size — Poster — Multiple — Booklet

Fit — Actual size — Shrink oversized pages — Custom Scale: 100 % — Choose paper source by PDF page size

Orientation: Auto — Portrait — Landscape

Comments & Forms: Document and Markups — Summarize Comments

Document: 21.0 x 29.7cm — 21.59 x 27.94 cm — Page 1 of 18

Page Setup... — Print — Cancel

Page Setup

Paper — Size: A4 — Source: Automatically Select

Orientation: Portrait — Landscape

Margins (millimeters): Left 25 — Right 25 — Top 25 — Bottom 25

OK — Cancel